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The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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[OFFICIAL NOTICE.]

Where to Find the Western Gas Association's Exhibit, and the Custodian Thereof, at the World's Fair.

To the Fraternity: The exhibit of the Western Gas Association, at the World's Fair, St. Louis, is located in Section 33A, Liberal Arts Building, where Mr. Fred. R. Persons, who is in charge of the same, will always be on hand to receive visitors and to explain anything that requires explaining.

[NOTICE.]

Twelfth Annual Meeting, Michigan Gas Association.

JACKSON GAS COMPANY,
JACKSON, MICH., July 20, 1904.

To the Members of the Michigan Gas Association: Preparations for the meeting of the Michigan Gas Association, to be held in Jackson, September 21st and 22d, 1904, are now well underway. The following papers are promised definitely:

"Retort House Practice in a Small Works," by Mr. George C. Turner, Secretary Coldwater (Mich.) Gas Light and Fuel Company.

"Temperatures as Applied to the Production and Purification of Coal Gas," by Mr. V. F. Dewey, Asst. Supt., Detroit City Gas Company.

"Commercial Lighting," by Mr. R. Schacklette, Manager Adrian (Mich.) Gas Company.

"The Formation of Naphthaline in Coal Gas," by Messrs. E. H. White and Samuel Ball.

In this connection let me call your attention to the "Question Box," with its special feature known as the "Trouble Box," which is in charge of Mr. E. F. Lloyd. Every member can help make this special feature a success by sending to Mr. Lloyd good, live questions or by relating their experience, or by asking help on the troubles they have had during the past year. If you have no questions to ask, no new experiences during the past year, and have encountered no troubles, this "Question Box" cannot help you. If the contrary is true, write to Mr. Lloyd, and *do it now*. Remember, all these things will be referred to some member for investigation, all of which takes time, and you should be as prompt as possible in communicating with Mr. Lloyd.

Don't forget to bring an application for membership from some fellow not now in the fold, and *be sure to attend the meeting yourself*.

Wishing that I will have the pleasure of welcoming you in Jackson,

Yours very truly, S. E. WOLFF, President.

[OFFICIAL NOTICE.]

Wrinkle Department, Western Gas Association.

OFFICE OF EDITOR WRINKLE DEPARTMENT,
ST. LOUIS, MO., July 25, 1904.

To the Members of the Western Gas Association: We again invite contributions to the Wrinkle Department of the Western Gas Association for the meeting of 1905. The Editor wishes to call the attention of the members of the Western Gas Association, and of the gas fraternity at large, to the fact that the "Western" has done good work in this de-

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partment in the past; that its Wrinkles have been of value to many, and that it proposes to continue the good work.

The Editor further wishes to suggest that an earnest effort be made to improve the quality of the Wrinkles submitted, as a great many of the devices, while of undoubted practical value, are such as any gas works' foreman should know. We desire the Wrinkles which have a greater bearing on the scientific and technical portion of our business. Of course, there will always be room for the little, handy, practical devices, which so often help us over the rough places. We will gladly receive them, but we should all aim to place the gas business on a par with other scientific and engineering enterprises which are practically in a basis of exact knowledge and high efficiency.

To that end, therefore, we desire to secure a large collection of Wrinkles for the 1905 meeting. Give us the benefit of the mathematical, chemical, thermal and other devices which have helped you in designing or improving your plants; do not hesitate to send in the practical devices which are not on record so far; submit the ideas which have made the business end a success; and, finally, let every individual contribute his portion, so that the result may be worthy the achievements of the past, and a credit to the Western Gas Association.

The following wrinkle is submitted as a sample to guide others somewhat in working out their contributions to this department. This describes a method of regulating the pressure on the outlet of a holder in proportion to the rate of sendout, and was contributed by the writer to another Association some time ago.

"The essential idea of street pressure regulation is to maintain a certain pressure at the consumers' meters within a small percentage either way of the fixed pressure. As the consumption increases or decreases, the holder pressure should be raised or lowered. This is usually done by having recording pressure gauges located in the district supplied by the holder, and raising or lowering the holder pressure until the best average for the district is reached.

"Now, it is, of course, true that the same conditions of consumption never obtain on successive days or months, and, therefore, the following automatic indicator was suggested by the writer: In the outlet pipe of the holder we place a Pitot tube facing the holder. Naturally, the opening from the Pitot tube which faces the stream of flowing gas gives the pressure due to the sum of the static head plus the impact or velocity head, whereas the side openings give the pressure due to the static head only. Therefore, any variation in the rate of flow of the gas is at once indicated by the variation in differential pressure from the two openings of the Pitot tube.

"By using a very sensitive differential pressure gauge, we can thus observe this variable rate of flow. It is, of course, necessary to calibrate the instrument for each holder to be able to tell what pressures to carry on the outlet pipe for each division on the sensitive differential gauge, and it would probably be well to check this three or four times during the year. The Laclede Gas Light Company has so far secured three satisfactory types of extremely sensitive differential pressure gauges, and we have arranged them with two scales, one of which shows the divisions in millimeters and the other gives the proper pressures to be carried on the holder outlet opposite the indicator on the gauge. The writer purposely refrains from adding drawings or too much detail to the above description, as he merely wishes to submit one idea, which he hopes will suggest many others to help swell the contributions."

We must start the work at once; therefore, please send your ideas to the Editor, 716 Locust street, St. Louis, Mo., and oblige, Yours truly,

W. A. Baehr, Editor Wrinkle Department.

BRIEFLY TOLD.

Twelfth Annual Meeting, Michigan Gas Association.—The officers of the Michigan Gas Association, even at this early date, announce that the preparations for the Twelfth Annual Meeting, to be held in Jackson, Mich., the 21st and 22d insts., are, for all practical purposes, complete. The paper list remains as it has been appearing in our official notices respecting the sessions, save that the title of the paper by Messrs. E. H. White and Samuel Ball is announced. It is on "The Formation of Naphthaline in Coal Gas," and the authors, the latter of whom is the holder of the Gas Scholarship in the University of Michigan, maintained by the Association, have tabulated a number of most interesting and useful experiments carried on in the University connected with the theory of their theme. Editor Lloyd has collected a most interesting set of queries for the Question Box and its close ally the Trouble Box. Wherefore it may be taken for granted that the technical part of the sessions will be busy affairs, especially when it is remembered that, in addition to the White-Ball paper and the "Box es," the delegates are to listen to an address from President Wolff, and set papers by Messrs. George C. Turner, V. F. Dewey and R. Shacklette, each of whom has chosen a subject that can be most usefully treated. The meeting will be the first under the action taken last spring, when it was decided to hold the conventions thereafter in September instead of February of each year. Secretary Douglas is well pleased over the number of applications in hand for new membership, but he is also anxious that the number will be further increased. A matter the treatment of which is awaited with great interest is as to the determination of the Association in the instance of the proposed federation of gas associations. Judging from what we have heard from representative Michigan gas men, the project does not seem to attract them strongly.

Proceedings, New England Association of Gas Engineers.—We are indebted to Mr. N. W. Gifford, Secretary of the New England Association of Gas Engineers, for a copy of the last volume of the Association's compiled records, which embraces the work done at the 27th, 28th and 29th annual meetings—years 1897, 1898 and 1899. The book is quite up to its predecessors, and that is good, loud praise, for they were all that could be desired, either in editing, printing and binding. The mechanical work was done by the New Bedford Printing Company.

Notes——

Mr. James Hart, of Mansfield, O., has been appointed superintendent of construction to the Sandusky (O.) Gas and Electric Company, vice Mr. Charles Brohl.

Prior to leaving his offices in the Binghamton (N. Y.) Gas Work's Company, permanently, Mr. Fred. B. Wheeler, the Company's former General Manager, was presented by the employees with an exceedingly handsome and serviceable suit case. The presentation speech was made by Mr. Wheeler's successor, Mr. E. E. Eysenbach.

Work on the new gas plant for Pen Argyl, Pa., is being energetically pushed by the constructor, Mr. A. M. Sutherland, of New York.

A correspondent in Utica, N. Y., writing under date of the 29th of August, incloses the following: "The betterments on the plant of the Utica Gas and Electric Company, which involve an expenditure of $40,000, are in a state of forwardness that insures their availability during the time of heavy output the coming winter."

That part of the annual report of Mr. E. G. Runyan, Inspector of Gas and Gas Meters for Washington, D. C., which has to do with the meter testing, declares:

"Nine hundred and three of the complaint meters were tested at the request of the Washington Gas Light Company; of this number 21 were found correct, 10 were fast—average error, 4.26 per cent.; 562 were slow—average error, 24.24 per cent.; and 310 failed to register any of the gas passing through them.

"Seven hundred and twenty-nine complaint meters were tested at the request of consumers in Washington, with the result that 379 were found correct, 284 were fast—average error, 5.08 per cent.; and 65 were slow—average error, 4.68 per cent.

"On complaint of consumers in Georgetown, 45 meters were tested. Of this number 13 were found fast—average error, 5.50 per cent.; one was 3.33 per cent. slow and 33 were found correct. One meter was tested by request of the Georgetown Gas Light Company and proved to be 10 per cent. fast.

"Of the 904 complaint meters tested at the request of the Gas Companies 21, or 2.32 per cent. were correct; 11, or 1.22 per cent. were fast; 562, or 62.17 per cent. were slow, and 310, or 34.29 per cent. failed to register any of the gas passing through them.

"Of the 774 complaint meters tested at the request of the consumers, 410, or 52.97 per cent. were correct; 97, or 38.37 per cent. were fast, and 66, or 8.53 per cent. were slow.

"In compliance with Commissioners' order of September 28, 1903, an assistant inspector from this office since that date has accompanied the representative of the gas company when taking monthly statements of gas meters in buildings occupied by the District government, and the meter statements have been recorded by each separately. Beginning with November, 1903, the District gas bills have received the certification of this office."

The Worcester (Mass.) Gas Light Company started business in 1849. The output for the first year was 7,000,000 cubic feet. In the last twelvemonth the sendout was 450,000,000 cubic feet.

[Continued from Page 331.]

TWELFTH ANNUAL MEETING, PACIFIC COAST GAS ASSOCIATION.

HELD IN MECHANICS INSTITUTE, SAN FRANCISCO, CAL., JULY 19 AND 20, 1904.

FIRST DAY—JULY 19—AFTERNOON SESSION.

The President—The next paper is by Mr. T. R. Parker, one of our Past Presidents, who will talk to you about

AULD LANG SYNE,

in other words he will narrate the gas history of the Pacific Coast.

Mr. Parker's paper was as follows:

CHAPTER I.

The matter of writing up a chronological or historical sketch of the birth and progress of the gas lighting business on the Pacific Coast has been asked for. Others have been importuned to assist in presenting some things that may have come under their observation in this interesting field of progress, but bashfulness, procrastination, or the briefness of the time allotted has materially interfered (with the exception of a few instances) with anything like complying with such a generous request. It will require the personal exertions of some individual, with both time and disposition at his disposal, to collect reliable data from existing records to accomplish this very desirable end.

In thinking over affairs on these lines of long ago, the fact of passing years with their accompanying changes was forcibly presented, also familiar faces whose names were then synonymous with the Pacific Coast gas business and in the busy marts of trade, but who are now fast fading from memory into the oblivion of the soon forgotten past. Some of these came up in review, and while thus soliloquizing, the strains of the ever familiar melody, whose first lines begin with "Should auld acquaintance be forgot and *never* brought to mind," were being presented for my entertainment in the home of our mutual friend and frater, E. C. Jones. It suggested itself as a suitable title for this most feeble effort. The names of Adoniram Pierce; of both Donahues, Peter and James; both Eastlands, Joseph and Van Leer; both Beggs, William and James; of J. Mora Moss, Tyler Sabbaton, David E. Knight, Charles W. Simpkins, James Hagen, Gallager, of Stockton, J. Q. Brown, Henry Adams, D. Tuthill, Young, of Vallejo, Peter B. Fagen, Homer Bloomfield, Peter de Mille, M. J. Elmore and J. B. Crockett, each of whom has joined the innumerable caravan that moves to the pale realms of shade. Memory brings them forth for our consideration. The smiles and frowns of fortune were various with many of them. The future biographer could fill volumes concerning their pluck and energy under adverse or favorable circumstances. W. G. Barrett, Charles E. Burrows, John S. Kaneen, F. H. Eichbaum and possibly J. R. Smedberg, and last, but not least, Professor T. S. C. Lowe, still remain, and like leaves in December, are still flickering in the top of the genealogical gas tree waiting for the inevitable blast.

But we will pass from these pleasantries to the things that identified some of them with the Coast field of illumination. A half-century has come and gone since Adoniram Pierce constructed a gas works on Jackson street in San Francisco, for the purpose of furnishing gas for Maguire's Opera House and the adjoining properties—an iron retort some 5 feet long, having a flue cast on it that ran from the back end along on the top to the front, there connecting with the standpipe. It was set horizontally and carbonized about 100 pounds of coal at a charge. The hydraulic main did service as tar well. A stirabout, or milk of lime purifier, was formed by a puncheon set inside of a larger cask, the intervening space between the two, filled with water, forming the cup or seat for the cover, with an agitating shaft and crank to stir up the lime from the bottom. The condenser or washer was composed of a few barrels set on end, tops connected, the inlet in each case having a slight seal. The holder, a small affair, had a capacity of about 3,000 or 4,000 feet, floated in a wooden tank, with a mast running up the center of the holder through the kingpost acting as the guide, this mast being guyed on top with rods to its surroundings. This primitive affair, the first of its kind on the Pacific Coast, did duty, tended by old "Paddy" Devine, a boiler maker, well known to the early gas men on the Coast. Until superseded by the San Francisco Gas Company, this or a similar retort did duty in an experimental bench in the cellar under "Billy" Beggs' office, corner of First and Howard streets, San Francisco.

So much for the first attempts at gas illumination. To the San Francisco Gas Company belongs the honor of the first manufacture of gas under a franchise on this Coast. The works were started February 11, 1854, and the present year is the semi-centennial or golden anniversary of that event, William Beggs, of Paterson, N. J., being the Superintendent; Peter Donahue, President, and Joseph G. Eastland, Secretary. It was a small beginning; a 20,000-foot holder, 4 purifiers, about 6 by 8, using hydrate of lime (one purifier being off for renewal), and iron retorts, 3 in a bed, were used, taking a charge of 500 pounds of coal to a setting. A narrative of the evolution of this gas works would, on account of the numerous and rapid changes and happenings, monopolize the entire time allotted to this meeting, so I will endeavor to be brief, avoiding dry details as much as possible.

The construction of larger holders at the old works, and at the then new station at Fifth and Howard; new stacks of benches, 3's of iron, back to back, of the old form of H setting; also 3's, introducing clays in open settings. About this time J. Mora Moss became President and W. G. Barrett, Secretary; the purchasing of adjoining properties to provide increased facility for exhaustion, condensation, purification and other necessary betterments became imperative; heavy street main extensions and suction meters were installed to draw gas on the down side of hills, manufactured by Morris Dobzinsky, the pioneer in the meter line on this Coast. The office of inspector was created over gasfitters to see that the pipes were tested and runs of proper sizes put in buildings and executed in a workmanlike manner. Mr. David M. Marshall filled this position for years, to the terror of the ever present "botch." A large part of the city being then on piles, the running of mains under the conditions of a swift running, rising and falling tide tried the patience, skill and swimming ability of the men so employed, as few there were who did not receive an involuntary bath.

About 1864, contentions became manifest from rival corporations asserting themselves. King street, Potrero, Butchertown and the Pacific Gas Improvement Company works followed, as named, in rapid succession, which resulted in absorption or consolidation and consequent over-capitalization, with the exception of the last named Company, who pooled its issues into mutual understandings. Manifestations from the electric current presented themselves, the first exhibition being what was then known as the Jablochkoff candle at "Cheap John's," on Kearney near Clay street, San Francisco, in the shape of an arc light. In the meantime Mr. Beggs was succeeded by Mr. J. R. Smedberg, from Memphir, Tenn., who erected additional benches of 6's (clays), introduced self-sealing retort lids of his own designing, installed and perfected the Pelouze and Audouin condenser, and put in operation a chemical annex in the shape of an ammonia works for producing aqua, sulphate and carbonate of ammonia.

The King street works, also the Potrero works, had become absorbed, and it fell to the lot of Mr. Smedberg to engineer the lowering of a 24-inch live main some 30 feet to the level of the railroad cut at the Potrero—rather an expensive undertaking. Mr. Tyler Sabbaton, of Albany, N. Y., succeeded Mr. Smedberg, but remained only a short time, death ending his usefulness. Mr. James Beggs, brother to William, succeeded Sabbaton, and J. B. Crockett succeeded Beggs.

Electricity had begun to demonstrate itself as a factor in the competition for public recognition. High candle power burners and regenerative lamps were sought for and introduced. The Lungren, Siemens, the Jenney and Albo-carbon—the merits of each were investigated. Preyayment meters, made in England, were brought out and tried. A water gas plant was installed at the Potrero and regenerative firing was adopted in retort benches.

Material reductions in price of gas had been made at different times to meet exigencies, which will be a part of the compiler's task to resurrect and present at some time in the future. The Welsbach burner made its appearance and was welcomed in its yet undeveloped form and composition as a champion to maintain the standing of gas in the field of illumination.

The appearance of E. C. Jones, of Boston, on this Coast was a happy event, not only to the Company that employed him but to the gas fraternity, both far and near, that came within the circle of his genial influence. The construction of the North Beach station from his plans and under his supervision speaks more eloquently than words of his ability in his chosen profession, for from his fertile brain emanated a works that was the admiration of the craft as to order, cleanliness, completeness of construction and efficiency in operation—a source of satisfying pride and profit to both officers and shareholders alike. The President, Mr. Crockett, found in Mr. Jones a consistent adviser and an efficient engineer. With these two busy brains came the inception and invitation that formed this Association, Mr. Crockett being its first President.

The consolidation of the San Francisco Gas Light Company with the Edison Light and Power Company is comparatively recent.

This covers in a rather desultory manner some of the changes. The spasmodic efforts to introduce the Tessie Du Motay, the Gale and Rand, as well as the Hall processes, have not been touched upon. The paralleling of street mains, the over-capitalization of stock, the summing up of the vast bulk of good gold expended in the various efforts to furnish light and divide business during the past 50 years in the metropolis of the Pacific, must be left to those better skilled in the art of transcribiug history, for but a bare skimming can be presented in the limits of a paper already too long. Still, I cannot drop this subject without paying respect to the old and faithful heads of the several departments, who were with the Company in the early 60's: John Barr, on construction; "Dan." Quigley, on street mains; Owen Gaffney, on services; "Jake" Radstone, on meters; "Mike" Hartnett and John Kelly, over stokers; John Cunningham, as brick mason; and "beautiful Barney" Keenan—all, with one exception, passed to the silent majority while in the harness of this Company. I believe there are two still in the Company's employ. I refer to Edward T. Floyd and John Yablonsky.

Chapter II.

Sacramento, named by the Spanish-Mexican Catholics in honor of a Christian institution, comes next on the list as a patron of coal gas. The Sacramento Gas Company was incorporated, August, 1854, by James Murray, Angus Frienson, N. W. Crittenden, Walter M. Rockwell and Edward Taylor. Price of gas, $9 per 1,000. Adoniram Pierce, David E. Knight and Charles Simpkins were in the service of this Company prior to their Marysville enterprise. Sacramento, although dignified with the title of "The City of the Plains," did not forge ahead, and for a number of years 3 benches of threes were found ample to supply all demands. Messrs. Pierce, J. R. Watson and William Bryan were successively superintendents; 1862 found John Q. Brown in charge with Harry Adams and "Bill" Davis assisting.

The old works were situated just north of the old Sacramento river bridge and were selling gas at $6 per 1,000. The most notable event concerning this plant was raising the street mains to conform to the new grade some 15 or 20 feet above old Sacramento. Most of the city was so raised to avoid inundation, the river having filled with mining debris or tailings. This task required money, pluck and executive ability to keep the town supplied during the hours of illumination.

The City Gas Company was incorporated in 1871, but information regarding this Oompany is vague, a flash in the pan more than likely. A strong effort was made by some Philadelphia capitalists to enter the field, with a concern known as the Citizens Gas Light and Heat Company, which was incorporated in 1872. They built on the grounds now occupied by the present works, selling gas at $2 per 1,000, the old Company reducing its price to $4 per 1,000.

The Capital Gas Company, incorporated in 1875, by Albert Gallatin, R. I. Clark, C. H. Cummings, J. R. Watson, James McClatchy, J. W. Pew, Oliver Eldridge, William Alford and D. W. Tallant, absorbed the Sacramento Gas Company and the Citizens Gas Light and Heat Company. Mr. Brown retired as Superintendent and accepted the position of State Gas Inspector. Mr. J. C. Pierson appears on the scene as Superintendent. This city then became the "Mecca" for electric light advances. The Brush, the Thomson-Houston and the Central Electric Company coming each in turn for purchase, the money departing often accomplishing their end. As Ben O. Steinmann, their President, has said, "They had all kinds of light—gas lights, electric lights and Israel lights." It was a city of "Poles."

In 1894 this Company had a disastrous fire, ruining the electrical annex, but by indomitable energy, and kindly assisted by confreres in the business, Mr. Pierson, by some makeshifts, was enabled soon to maintain current. The Folsom Light and Power Company about this time was under headway to enter this same field, which it eventually did, and I understand, narrowly escaped bankruptcy, but by inducing the North Yuba Electric Company to extend the power lines to Sacramento, they were thereby saved. George W. Jackson succeeded Mr. Pierson, who retired to attend to his mining interests.

The Sacramento Natural Gas Company, incorporated December, 1896, by J. Hass, J. McCarmiels, Henry Keyes, T. Quale and J. N. Jensen, all of Stockton, commenced distributing gas January 1, 1898, and selling the gas at $1 per 1,000 cubic feet. It is still a factor as a bidder for public patronage. The old Company has had all but "a bed of roses" to recuperate on.

Water gas apparatus was installed by the United Gas Improvement Company, which was afterwards superseded by the new Lowe crude oil, and is now run under the supervision of R. P. Valentine in the interest of the California Gas and Electric Corporation.

Chapter III.

Marysville, named in honor of Mary Murphy, one of the few survivors of the ill-fated Donner Lake party, comes third on the list. In 1857 various propositions were made to the Common Council relative to lighting the city. Charles H. Simpkins, a prominent citizen of Marysville, and who had the ability to perform whatever he undertook, together with A. F. Williams, who has been well and favorably known as connected with the water ditches in the northern part of California, made proposals on similar terms to those made with William Glen, in January, 1855, for furnishing the city with gas and pure water. Messrs. Tiffany and Wethered, two well known citizens of San Francisco, had also made a proposition to the Council, as also Dr. Tregarden, of Marysville, and D. E. Knight, a gentleman connected with the gas works in Sacramento, contemplated making a similar proposition.

On the 22d of May, 1858, the Marysville Coal Gas Company was incorporated by David Edgar Knight, Charles H. Simpkins and Adoniram Pierce, capitalized for $50,000, which was increased to $100,000 on May 20, 1875. The incorporators organized by electing D. E. Knight, President, and William Harvey, Secretary, May 10, 1858.

The right to lay pipes through the streets of Marysville for the purpose of distributing gas was granted to D. E. Knight & Co., in exchange for which D. E. Knight & Co. agreed to furnish free gas for lighting all public buildings so long as no franchise was granted to other parties. Knight & Co. then organized the above coal gas company. Under the personal supervision of Messrs. Knight and Simpkins, the latter being interested with the Sacramento Gas Company at that time, the construction work was pushed on to completion by Pierce, and on the 18th day of August, 1858, the first gas was manufactured in Marysville, and sold at $12.50 per 1,000. The work consisted of 2 benches of threes, iron "H" settings, erected in a small, brick, flat-roofed warehouse, capacity 18,000 feet in 24 hours. The roof was found quite convenient to stand on while punching out obstructed standpipes down through holes in the roof; a 3-inch cast iron return pipe condenser in the coal shed; 2 casks, one above the other, did duty as washer and scrubber; wooden box purifiers, using hydrate of lime on perforated sheet iron trays; a 3-inch station meter, and workshop presided over by "Ike" Trump; all situated in a long wooden shed; a 20,000 cubic foot holder, built flat on top, the sheets running straight across after the manner of sheets on a tin roof, held down by screws into the wooden framework and braces that were on the inside of the holder; the guidepost frame and tank also were of wood. The works were situated about midway of the block between Second and Third streets and B street and Virgin alley; main entrance and office on the alley.

In 1860, with 14,550 feet of mains and 200 consumers, the average output was 200,000 feet per month. The first reduction in price was made December 16, 1860, in response to a petition from the public. A system of discounts was established, 10 per cent. being allowed on consumption of over 200 and less than 1,000 feet per week and 15 per cent. on all over 1,000 cubic feet. In 1862 a uniform price was established of $10.50 per 1,000, income tax added. Weekly collections were made from the business houses, and monthly from dwellings, churches, offices, etc.

In the spring of 1867 the works were constructed complete, where they now stand; ironwork, holder, etc., were shipped out from Philadelphia on the clipper ship "Old Hickory," some time in 1866. She was 356 days on the way and given up as lost by the underwriters. The captain lost his commission, but the ship arrived safe in port.

In 1867 a voluntary reduction was made to $9 per 1,000. Gas was made entirely from the richest cannels from Scotland, Ireland, New Brunswick and Australia, sacked in gunny bags in San Francisco and freighted by steamer to Marysville. Boghead, Ince Hall, Lesmahago, Albertite (cannels) and Australian shale were then familiar names of coal. Prices ran all the way from $25 to $50 per ton in San Francisco. Freights were then too high to admit the use of low grade coals in the interior towns, as the freights from San Francisco to Marysville, together with drayage, exceeded rates round Cape Horn. Castor beans, rosin, wool waste and pitch pine assisted at intervals. Lime was furnished by "Billy" Gwyne, hauled in rawhide baskets from Cave City and delivered in Marysville at $2 per basket, about 2 baskets to a barrel. Firebrick was shipped from the East, packed in straw in crates, at $125 per 1,000; tile packed in the same manner, 15 by 30, at $5 apiece. Price paid to the company for gasfitting was 50 cents per foot, including time, fittings extra; coke sold at 1 cent per pound (unscreened), and tar at $7.50 per barrel, purchaser furnishing the barrel. Up to 1895 there were no public lamps of any kind in Marysville.

This corporation was disincorporated on January 18, 1896. The Marysville Gas and Electric Company, incorporated November 11, 1895, succeeded to the business of the former corporation. The new organization was controlled and conducted by D. E. Knight; Simpkins and Pierce, as well as "Bill" Harvey, all having passed to the silent beyond. Knight died January 5, 1900. In February, 1900, the works passed into the hands of Mr. John Martin and his associates, and are prospering under the present management.

Chapter IV.

Stockton, named after Commodore Richard F. Stockton, U. S. N., though better known in years gone by as the City of Windmills, comes next. Its works were generally spoken of among gas men as "Noah's Ark," on account of its general ancient appearance and the relics in evidence in its vicinity. It was formed as a company in 1859 as the Stockton Gas Company, with P. E. O'Connor as Superintendent. It received its franchise (presumably a protective one) from the City Council, approved by the Mayor June 25, 1859, selling gas at $10 per 1,000. They pursued the even tenor of their way until April, 1869, when Harry Adams (father of the present Superintendent) became Superintendent, and Joseph G. Eastland, President. The price was then reduced to $7.50 per 1,000.

They installed their first electric arc plant in 1883, and incandescent 4 years later, being reincorporated under the name of the Stockton Gas Light and Heat Company in 1890. Mr. Eastland, having a controlling interest, was chosen President, and remained so up to the time of his death, November, 1895, and was succeeded by Captain Oliver Eldridge; he again by F. A. Hilm.

Natural gas became a competitor in the nineties, and to offset it the Loomis system was introduced, but the obstacle of changing the entire consumers' burners of the town, or even sections of the town, from illuminating to fuel gas burners, presented itself as being too great. So the set was converted to make carburetted water gas, and was so used up to the consolidation with the Stockton Natural Gas Company, January 18, 1895, which now forms the present Stockton Gas and Electric Company, gas selling now at $1.50 per 1,000. Thirteen dollars and 75 cents was the first charge for arcs; they are now $10 less.

Chapter V.

San Jose, the Garden City, next falls in line. The first gas company to incorporate here was the San Jose Gas Company. Its articles were filed on February 25, 1879. The incorporators were James Hagan, of San Jose, and J. K. Prior and Thomas Anderson, of San Francisco; the officere were: James Hagan, President; Austin Roberts, Secretary.

Although this is the first record of the actual incorporation of the San Jose Gas Company, it had existed probably as a copartnership for a long time prior to its incorporation. The archives of the city clerk's office show that, July 13, 1860, an exclusive privilege was granted to James Hagan to lay mains, build works and furnish gas to the people of San Jose for the term of 15 years, at a rate not to exceed $10 per 1,000 feet of gas. The ordinance granting the privilege contains one section, which I quote for the purpose of showing the cost of coal to be used in gas manufacture, and also to show even at that early date municipal bodies were aware of and exercised their right to regulate gas rates.

"Sec. 8. That if it shall appear at the expiration of 5 years from the date hereof that gas can be furnished cheaper than now, having reference to the price of labor and material used in the manufacture of gas (coal being rated at $53 per ton), it shall then be lawful for the city authorities to make such reduction in their discretion as shall seem just, so that the rates shall not be less remunerative than they would be now; and at the end of 10 years a like reduction may be made, should labor and material still further reduce."

It is interesting to note in this connection that the railroad communication between San Francisco and San Jose was not established until 1865, prior to which date coal was brought to Alviso in vessels or barges, thence hauled by teams to San Jose, a distance of some 9 miles, over roads which were none too good at any season of the year, but which, during wet winters, became impassable through the overflow of the various streams which enter the bay at or near Alviso. During such periods of overflow the coal needed for the gas works was carried from Alviso on pack mules; once in a while a mule with his burden would be swept away while fording some swollen stream, both mule and coal being beyond recovery. This being so, there is doubtless quite a deposit of coal and mules somewhere in the Alviso flats.

It may be interesting to note that the first holder built and used by this Company had a capacity of about 8,000 feet. The material used in the construction of its tank was 3-inch redwood. In the year 1888 this tank was torn out, having been in use and in the ground 28 years, but its redwood material was found as perfect as the day it was built. Part of this sand material was made use of in the buildings at the present gas works of the Company.

While the San Jose Gas Company was the pioneer in the work of actually supplying gas to San Jose, several efforts were made by other parties at various times to procure and exercise this privilege; one of these even antedated the franchise granted to James Hagan and his associates. January 18, 1858, the City Council passed and approved an ordinance authorizing George Wheeler and John Ashley to lay pipes for the purpose of lighting the stores and streets of San Jose. This project apparently came to naught. In 1868 a project was presented and filed by George Hearst and others, asking for the privilege of laying mains and supplying gas to the city. It will thus be seen that one of our great editors, an aspiring, leading candidate for President of the United States, has come by his faculty for distributing "hot air" honestly, On June 20, 1877, another rival of the San Jose Gas Company appeared in the field, in the form of the Garden City Gas Company, which was incorporated on that date with Z. P. Boyer, of Pennsylvania; J. W. Walker and John H. Brucken, of Oakland; J. C. Uhler, of San Francisco, and W. P. Dougherty, C. B. Hensley and Return Roberts, of San Jose, as its incorporators. Z. P. Boyer was manager. The works were located on St. Augustine street, the present site of the gas works of the United Gas and Electric Company. I believe this Company was the first on the Coast to manufacture gas by the Lowe process. After two or three years of active rivalry, the San Jose Gas Company absorbed this corporation and, in 1889, was consolidated with the Brush Electric Light Company and reincorporated under the name of the San Jose Light and Power Company.

During the earlier years of the San Jose Gas Company the high rate charged for gas ($10 per 1,000 feet) caused considerable public discontent. The older residents of the city recall vividly their struggle for a reduction in gas rates. John Stock, pioneer hardware merchant of San Jose, in speaking of the matter the other day, and illustrating the economy practiced during that period, said, with a twinkle in his eye, "My gas bills were less when I had to pay $10 per 1,000 than they are now with gas at $1.50."

In 1865 a special committee of the City Council made an investigation into the business and profits of the San Jose Gas Company and its report showed that the original investment of the Gas Company, in 1860, was $21,000, that during the first 5 years of its existence its total expenditures for betterments, materials and labor in the business of gas manufacture was $55,637.93; that its receipts from gas rates during that period amounted to $75,617, and that the 3 founders of the Company had divided in dividends $19,979.52, or almost the amount of their original investment.

Chapter VI.

Gas was first introduced in Grass Valley by Edward McLaughlin, formerly in the hardware business in that city, but now a banker of San Jose. A company was incorporated, in 1862, with a capital of $20,000, under the title of "The Grass Valley Gas Company." Officers and directors as follows: Ed. McLaughlin, President; A. V. Brady, Secretary; and Charles Jenkins as one of the directors.

Gas was made from pitch wood and coal, the price being $10 per 1,000 cubic feet; holder capacity, 3,000 cubic feet. The above Company sold out, in 1865, to A. Pierce, a resident of Nevada city and also owner of the Nevada gas works and part owner of the Marysville and Oroville gas plants, for $20,000, after which the price of gas was reduced to $8 per 1,000 cubic feet. Later it was transferred to A. A. Mulloy and wife, consideration not given, and shortly after to Peter Johnson and A. B. Dibble about 1871, the two latter paying $16,000 for the plant. Pitch, coal and wood were still used, and price of gas was $8 per 1,000 cubic feet. The plant was then enlarged and improved and a 5,000-foot holder erected. In 1882 Peter Johnston sold out to A. B. Dibble for $8,000, and the price of gas was reduced to $6 per 1,000 cubic feet. In 1885 A. B. Dibble sold out to John Glasson; price not stated. Gas sold at $5 per 1,000 cubic feet, and was still made from pitch, wood and coal.

In 1898 John Glasson sold out to the Nevada County Electric Power Company; consideration not given. Gas was then made from crude oil and reduced to $3 for illuminating and $2.50 for fuel. Even at these prices very little gas was sold, less than 60 consumers using the same in Grass Valley, very little fuel being sold.

In 1901 the Nevada County Electric Power Company was absorbed by the California Central Gas and Electric Company and the plant has been run from that date up to the present under the name of the Nevada County Gas and Electric Company.

In 1902 a new high pressure plant was installed by the Lowe Crude Oil Water Gas Company and a 2-inch main was run to Nevada City, a distance of 4½ miles, one plant thereby supplying both towns. The storage capacity has been increased at different periods and the price of gas has been reduced to $2 per 1,000 cubic feet for illuminating and $1.50 for fuel, which are the present prices. Number of consumers has increased fourfold owing to extension of mains and fuel gas being used for cooking, etc., together with the new price of gas. A brilliant future is insured for gas both in Grass Valley and Nevada City, with the excellent plant this Company has now installed.

Chapter VII.

Petaluma (a Spanish word meaning "Duck Hill") entered the list of gas cities on September 14, 1863, when the Petaluma Gas Light Company was incorporated with the following Directors: Wm. W. Beggs, Charles M. Baxter and W. B. Minturn. The materials for construction, with the exception of the holder, mains and tank, were taken from the junk pile and refuse heap of the San Francisco gas works. There were 2 benches of 1's, cast iron, and a 7,000 cubic foot holder in a wooden tank that was sunk half its height into the ground, the earth being taken out and piled up around the other half. John Cameron, of Philadelphia, supervised the work, under the direction of Mr. Beggs. "Tom" Beggs (no relation to "Billy") laid the mains. He could polish off a joint in less time and in better shape than any man I ever knew. James Eckles and the writer fitted up the buildings of the town, and John Barr and Matt. Douty constructed the works, with John Cunningham as bricklayer.

About Thanksgiving day that year gas was first turned into the mains and the town lighted at $10 per 1,000. Peter Donohue shortly after secured a controlling interest, who installed his son, Mervyn J. Donohue, Superintendent. During his administration the holder tank burst, the holder collapsed and desolation reigned. The wreck, or what was left of the plant, was purchased by E. T. Farmer, L. A. Kelly and their associates, who reconstructed a plant at the lower, or opposite side, of the town, Mr. Kelly acting as Superintendent. The original mains of 3-inch and 4-inch, in 9-foot lengths, Scotch pipe, are at this writing in the ground, doing good service. Gas was reduced to $8 per 1,000. Later on the plant passed into the control of banker I. G. Wickersham, who enlarged the plant by extending the mains, reducing the selling price to $5 per 1,000. About 1897, Mr. F. W. Van Syckel induced Mr. Wickersham to change from coal to what was known as the Van Syckel system, using crude Coalinga oil to alternately generate heat and produce gas, using air as a diluent. This remained in operation for 5 years. In the latter part of 1900 Mr. Wickersham disposed of his interest to the Petaluma Gas and Electric Company, making consolidation of the gas and electric system for the first time in Petaluma. Rates were then reduced to $2 per 1,000 for heating and $3 for illuminating.

In 1901 the California Central Gas and Electric Company purchased the stock of the said Company, and introduced its pipe line, pumping gas from Santa Rosa through 18 miles of 2-inch pipe under pressure from the Lowe generators at that town.

Both Beggs (William and "Tom"), Barr, Doughty, Cunningham, Cameron, Baxter, Eckles, both Donohues, and Wickersham, have all passed over the Grand Divide.

Chapter VIII.

Oakland was named for the numerous oaks in its locality. The Oakland Gas Lighting Company was incorporated June 12, 1866, by Joseph G. Eastland. Andrew Chabot and Wm. W. Beggs, all since deceased. Henry Adams, from the Sacramento gas works, was the first Superintendent of the Company, remaining so from the starting of the works, April, 1867, until July, 1868, when he was succeeded by Van Leer Eastland as Superintendent, who remained with the Company in that capacity until his death, September 8, 1894. Andrew Chabot was the first President.

The first installation consisted of 1 bench of 3 iron retorts, 1 single purifier, 6 by 8, and a holder having a capacity of 10,000 cubic feet, This holder was further supplemented by one completed in 1868, having 20,000 cubic feet capacity. All the mains laid at that time were cast iron and the outlet pipe at the works was 3-inch. In 1873 an 80,000 cubic foot holder was completed; outlet to works, 8-inch; the retort house was increased to 3 benches of 5's, all of these benches being of the open setting type. Two additional purifiers, each 8 by 8, were installed.

In 1877 the distributing part of the works was removed from First and Washington streets, to the block bounded by First and Second, Jefferson and Grove, when a double-lift holder, having a capacity of 450,000 cubic feet, was installed, and a purifying house containing 4 purifiers, 12 by 12 by 4, all of modern type, were also installed. In 1879 a Lowe water gas set was installed, having a capacity of 20,000 cubic feet per hour. The retort house in the meantime was extended so as to comprise altogether 12 benches of 5's, although at no time were more than 8 benches ever used. When the works at First and Jefferson were installed, the outlet of works was changed from 8-inch to 16-inch, as it now remains.

In 1877 franchises were obtained and holders erected in the towns of Berkeley and Alameda, the one in Berkeley having a capacity of 50,000 cubic feet, the one in Alameda having 20,000 cubic feet. Subsequently, in 1883, in the city of Alameda, a double-lift holder, erected by Messrs. Deily & Fowler, of Philadelphia, was installed, having a capacity of 150,000 cubic feet, which holder is still in service. The Berkeley holder has been dismantled. Both towns are really being supplied by the high pressure mains from the Oakland station. In 1886 a 3-lift holder, capacity 750,000 cubic feet, was built.

In 1885 a Springer set was installed in Oakland, having a capacity of 30,000 cubic feet per hour, and in 1887 an additional one with similar capacity. In 1899 a Western Gas Construction Company's set was installed at the Oakland station, with a capacity of 50,000 cubic feet per hour, and in 1902 a Lowe, crude oil, water gas set was installed, having a capacity of 100,000 cubic feet per hour. From 5 miles of main existing in 1868, the amount has been increased in the entire territory to over 200 miles. So much for the physical end.

As to the personal end, as mentioned before, the 3 incorporators have died, as have also the two superintendents. The following named presidents of the Company have all since passed to the great beyond. H. H. Haight, ex-Governor of California, was President from 1867 up to the time of his death. Joseph G. Eastland, was Secretary of the Company, from its incorporation until 1883, and President from 1883 to the time of his death, 1895. The other Presidents who served for a short time were: Anthony Chabot; W. W. Crane, Jr., ex-mayor of Oakland; Hon. J. West Martin, ex-mayor of Oakland; John W. Coleman, President of the North Pacific Coast Railroad Company, now known as the North Shore, and D. E. Martin.

Of the men who assisted in the construction of the work and the general laying down of the plan, aside from Van Leer Eastland, who was directly in charge of it all, I recall W. W. Beggs and James Beggs, his brother; James R. Smedberg and Homer Bloomfield, all of whom, with the exception of Smedberg, are now dead. John Barr was for many years foreman of pipe work, and it is interesting to note that his son, "Dan" Barr, is now a collector for the Company. John A. Britton is now the only living representative of the Oakland Company of the old regime. He commenced work with them, in the spring of 1874, as meter setter, meter repairer and general laborer, was elected Secretary in 1883 and President in 1899. In connection with the gas business, the Company took on the electric light end January, 1882, and has since controlled the entire field in that district.

Voluntary reductions in gas rates in the city of Oakland were made as follows:

Year.	Rate per M.
1867	$7.50
1870	6.75
1871	6.00
1872	5.00
1874	4.50
1875	4.25
1876	4.00
1877	3.75
1879	3.50
1881	3.25
1883	3.00
1886	2.75 and $2.50 for heating use.
1889	2.50 " 2.25 " " "
1894	2.25 " 2.00 " " "
1895	2.00 " 1.75 " " "
1897	1.75 " 1.60 " " "
1898	1.50 " 1.25 " " "
1900, gas for municipal purposes, $1 per M.	
1903	$1.25 and $1 for heating use.

Chapter IX.

Vallejo was named for General M. G. Vallejo, owner of an immense Mexican land grant of 250,000 acres in that section. Mare Island was his reserve to pasture his mares.

In 1866, a Mr. Young, formerly connected with the San Francisco Gas Company, constructed a gas works in Vallejo. The apparatus was open to the weather; no buildings, sheds or cover other than the sky. A 7,000-foot holder, floating in a redwood tank, which leaked so badly that the fireman had to perform the act of waterman when the tide was

out, by pumping water into the tank from the river with a 4-inch Spear pump.

The town was first lighted with gas July 4, 1866; the price was $7.50 per 1,000. Mr. Young was unfortunate enough one day to discover that a party named Lee, a hotel keeper, was by-passing gas regardless of the meter. In endeavoring to correct matters, Lee shot him, Young dying from the effects of the wound in something over a month.

General Frisbie became interested, and soon after erected the present works in another part of the town, 3 benches of 3's, and a 20,000-foot holder. Mr. Peter B. Fagen became Superintendent and W. J. Tobin, Secretary. In 1876, Mr. J. R. Smedberg was called on to lay a 2-inch pipe across the Mare Island, as the small Maxim affair erected by J. K. Prior on the Island did not render efficient service. Mr. Smedberg connected his pipe together on Georgia street, reinforcing the screwed couplings with cast iron sleeves, leaded and caulked. A cable was made fast to the pipe and connected with a capstan on the Island, and it was pulled across the river, a couple of empty barrels being made fast to the forward end of the pipe to buoy it up over any possible obstruction or plowing down into the mud. An Otto gas engine supplied the motive power to force the gas across and blow out probable water seepage or condensable matter that otherwise might accumulate in the pipe. The gas was received in a small holder on the Island to give a uniform pressure and to prevent oscillation from the pumps on the Vallejo side. General Frisbie retiring from the gas business, Mr. Wilson, of Vallejo, became controller. Mr. Fagen, obeying the inevitable call that awaits us all, Mr. J. W. Thomas appeared upon the scene as superintendent.

The next notable change at this works was the converting of a single-lift gasholder into a double or telescope while doing duty, thereby doubling its capacity. This engineering feat was engineered by E. C. Jones, the Bay City Iron Works being the contractors, and completed in 1896. An account of this is given in the "Proceedings" of the P. C. G. A. of that year, that is well worth reading. I believe it was the first attempt to cup the bottom sheet of an old holder while it was in use.

A notable incident connected with the history of this Company is that "Hetty" Green, said to be the richest woman in America, is a stockholder, which is another evidence of this lady's good judgment in making her investments.

Chapter X.

Napa is an Indian name, after a tribe known as Napas. The gas business at Napa dates from 1867. William Smith and E. E. Chalmers secured a franchise and they conveyed their rights to James H. Goodman, James Freeborn and William W. Beggs, who incorporated the Napa City Gas Light Company, with a capital stock of $80,000, May 25, 1867. Mr. Beggs was at that time Chief Engineer of the San Francisco Gas Light Company. The plant was built at a cost of $16,000. The works were located on a lot 60 by 120, between Main and Brown streets, fronting on Fifth. The building, of brick, was a counterpart as to size and style of the then Oakland gas works, which was also designed by Mr. Beggs. The office, condensing and purifying room, retort house and workshop were all under one roof. A 7,000 cubic foot holder, floating in a redwood tank, 2 benches of iron retorts, 1 retort in each bench (1 bench being in reserve), capable of carbonizing 200 pounds at a charge. Oak wood and whatever coke was made were used to keep up the heats, carbonizing Scotch and Australian cannels, costing from $20 to $30 per ton; schooner's freight, $2.50 per ton, and drayage $1 added. As all coal sold in San Francisdo for reshipment had to be sacked, 25 cents per 100 for gunny bags and 5 cents a sack for filling and sewing, made this carbonizing material rather gilt-edged by the time the cost of dumping it into the coal shed was added. From 4 to 4½ feet to the pound was the estimated yield, as no station meter was on the premises. The condenser, a 3-inch upright return pipe affair, made of tin, as also was the center seal, were both furnished by Morris Dobzinsky, the first manufacturer of gas meters on this Coast. Two redwood boxes for purifiers, 4 by 5 by 3 feet, with wooden screens for dry lime, lime costing $2.25 per barrel. All pipes around the works beyond the condenser were of galvanized sheet iron, soldered at joints, made and put up by local tinsmiths.

Gas was first turned on and the town lighted September 1, 1867. Harry Adams, formerly with the Sacramento Gas Company, and later as Superintendent of the Oakland gas works, was the first Superintendent at this place. Gas was sold at $7.50 per 1,000, to 65 consumers, the county paying for 33 street lanterns; $9 each per month was the modest charge, they being lighted and extinguished according to moonlight schedule, the posts and lanterns belonging to the Company. All renewals and repairs were paid for by the county. The street mains were mostly of condemned boiler tubes, 2½ inches in diameter, in 6-foot lengths, joined together with cast iron sleeves, leaded and caulked.

In April, 1869, Mr. Adams resigned, having accepted the position of Superintendent at the Stockton gas works. The writer succeeded Mr. Adams. At this time James H. Goodman, James Freeborn and Capt. Harry Parker were Directors; Richard Dudding, Secretary. About this time the lull caused by civil strife was fast disappearing and the evidence of prosperity began to assert itself over the whole State, and Napa fell in line. The income tax was abolished; the growth of the town became manifest by extensions and renewals, and the price of gas was reduced to $6 per 1,000. Benches of 2's (large clay) were introduced and they were capable of working off from 300 to 400 pounds of coal each at a charge; the purifying room was remodeled, the old flues being substituted with cast iron, and mains of larger size; lamp posts increased in number and decreased in price to $6 per month each. New conditions baving arisen, soft coals had come into use: Nanaimo, from Vancouver; Greta, Wallsend and other Australian coals, commonly known as Sydney coals, enriched either with Anvil Creek cannel or shale from Australia, or Peruvian cannel. Coke sold at $20 per ton and tar at the rate of 10 cents per gallon. Dividends began to appear at the rate of 15 per cent. on actual investment. This warranted the Company to again voluntarily reduce the price of gas to $5 per 1,000, and 90 street lamps to $4.50 each per month.

On August 13, 1888, the Directors concluded to erect a new works, and Mr. John Fullagar, formerly Superintendent of the Cincinnati (O.) gas works, was authorized to proceed for the Company, also to disincorporate and reincorporate under the name of the Napa Gas Light and Heating Company; articles of incorporation dated November 20, 1888. Its first Board of Directors was: George E. Goodman, Theo. R. Parker, E. S. Churchill, Isabella Parker and James Freeborn; H. P. Goodman, Secretary, and John Fullagar, Superintendent. The new works were erected on the present site, a 20,000 cubic foot holder, a 6-inch works complete with a Hicks setting of clays. Price of gas was again reduced to $4 per 1,000, street lamps to $3.50 for all night and every night service. In 1889 Mr. Fullagar resigned to take charge as Superintendent of the San Jose gas works. New settings were installed from plans suggested by the Kreischers, of New York, designed by A. C. Wood, of Syracuse, N. Y., which were eminently successful as gas producers of the full regenerative type, 5 retorts, capable of carbonizing 1 ton of coal in 4 hours, giving a yield on an average of 11,000 feet. Time having wrought changes by age and death, Goodman, Freeborn, Beggs, Adams, Dudding and Captain "Harry" having performed their part on our little globe, were to us no more, and those remaining desiring peace and retirement, accepted an offer from Dr. Thomas Addison and John L. Howard, August 1, 1899.

In the spring of 1901 the California Central Gas and Electric Company became the owners, inaugurating a complete change, discarding coal and installing the Lowe oil generators, and have greatly increased the output.

Chapter XI.

San Rafael was named for one of the numerous saints in the calendar. The first gas plant in San Rafael was started by Mr. Allen Lee, November, 1871. It consisted of a Maxim machine and gas was sold at $5 per 1,000.

In 1876 Mr. Lee formed a partnership with Mr. J. O. Eldridge, and they built the first holder and coal gas plant and continued to operate until December 5, 1887, when the Company was incorporated. The incorporators were Charles E. Green, Sidney B. Cushing, Allen Lee, E. G. Stetson and Upton M. Gordon. In 1883 the price of gas was reduced to $4.50 per 1,000; in 1885 to $3.50 per 1,000 and in 1890 to $3 per 1,000.

Mr. Lee was President and Manager until his death in 1894. Mr. Cushing succeeded him to that office, and held it until August 14, 1901, when the plant was purchased by the California Central Gas and Electric Company. Mr. J. S. Kaneen was Secretary and Superintendent from 1890 to 1901.

Chapter XII.

Santa Rosa. A concern known as the Maxim Gas Company was the first to present a gasoline vapor and sell it as gas to the citizens of this place. The Company was incorporated April 15, 1872. F. H. Coe, John Brown, C. Kessing (afterward State Inspector of Gas Meters), E. T. Farmer and W. B. Stanley were the incorporators. On account of its irregular candle power it became unsatisfactory, and was abandoned. The Santa Rosa Gas Light Company was formed and incorporated March 18, 1876. The directors were John E. Ayer, L. A. Kelly, C. F. Juillard, E. T. Farmer and W. G. Atkins; L. A. Kelly acting as Superintendent for this and the Petaluma plant. Australian and Vancouver coals were the chief carbonizing materials used, cost-

ing from $14 to $16 per ton. Gas sold at $7.50 per 1,000. Two benches of threes, a 6-inch pipe condenser, and wooden box purifiers, using dry lime, were parts of the plant. The works were erected on the premises of the present works, and were recently torn down by M. G. Osborn, our Past President, to make room for new installations. Messrs. Kelly, Kessing and Ayer disposed of their interest to John A. Paxton and John S. Kaneen; Mr. Kaneen acting as superintendent. It is interesting to note that for an entire year, late in the seventies, under his supervision gas was made exclusively from wood of the red fir, costing at the works $10 per cord. He estimates that from it he obtained from 14,000 to 18,000 cubic feet to the cord. For a long time the refuse from vineyards such as grapevine sticks, leaves and litter, the seeds and pomace from the wine presses were used. These were spread out in the sun to dry, it being the main difficulty in using this material to eliminate the moisture contained. As an enricher Mr. Kaneen used Peruvian oil, costing $2.25 per barrel; he used iron pots, measuring 12 inches by 14 inches by 8 inches, filled two-thirds full with this oil, leveling off the top of the pot with sawdust. One of these pots was placed in with each charge, which assisted the yield, bringing it up to 20-candle power. The gas from this composition was disposed of at $4 per 1,000 up to 1886, when the price was reduced to $3 per 1,000. John Barr, familiarly known as "Johnny" Barr, formerly with the San Francisco, Petaluma and Oakland works, appears as superintendent. Mr. Kaneen, I believe, had been called to Los Angeles by Charles Simpkins, the promoter of that works, to superintend. In 1887 Mr. Berry succeeded Barr as superintendent. On May 10, 1888, Mr. Paxton died and his death precipitated a change in affairs, as Mr. Kaneen, acting for the Paxton estate and also for himself, sold the entire stock to Messrs. W. B. Cline, President of the Los Angeles Lighting Company, C. O. G. Miller, President of the Pacific Gas Improvement Company, of San Francisco, and J. M. Livingston, President of the Pacific Lighting Company, for $55,000. The name of the Company was changed to the Santa Rosa Lighting Company. Capitalized for $100,000. Mr. Livingston, President; Mr. Miller, Secretary and Treasurer, and Mr. Murdock, Superintendent. The latter was succeeded by Mr. A. Gutsch, February, 1896. The plant now consisted of 2 sets of fives, open settings, and considered a full 6-inch works. Mr. F. H. Eichbaum, Chief Engineer of the P. G. I. Co., was called in consultation for betterments. Three benches of fives, half regenerative furnaces, a steam jet exhauster, a condenser and scrubber and 4 cast iron box purifiers and a 35,000-foot holder was the result. In 1897 the works were sold to Philip Meyer (of Welsbach fame) "on a promise to pay." He kept the works 3 years, but he could not keep his promise. He failed for $56,000 and no assets. Mr. Gutsch was retired as Superintendent. In August, 1901, the California Central Gas and Electric Company acquired the properties, both gas and electric being held in common. They have installed the Lowe crude oil gas apparatus. Strictly speaking, the Santa Rosa and Petaluma gas field should be considered as a single unit, for the latter is entirely dependent on the Santa Rosa pipe line for its supply of gas.

Chapter XIII.

Chico, meaning *small* town or village, used a limited supply of artificial gas some 2 years prior to the organization of the Chico Gas Company, *i.e.*, in 1872, the distribution being effected through wooden pipes in a very limited section of the city. Gasoline gas was made at first in benches consisting of 3 round iron retorts, each 4 inches in diameter and 7 feet long, and this gas, which had an average illuminating value of 18-candle power, was sold at $6 per 1,000. Afterward, the gasoline plant was abandoned and oil gas was made and delivered direct to the holder at a water pressure of 5 inches, but it is recorded of this oil plant that it made more lampblack and oil tar than gas. But to revert to the earlier period of the Company's existence. It was organized December 8, 1874, and incorporated as the Chico Gas Company, December 19th of the same year, its first officers being Messrs. A. Bullard, President and Treasurer; George F. Nourse, Vice-President; C. L. Stilson, Secretary, and N. P. Fuller, Superintendent. These gentlemen, together with Messrs. J. W. Giltyson, John E. Ayer and L. A. Kelly, constituted the first board of directors. Originally there were but 3 stockholders, in addition to the names already mentioned. They were George W. Dorn, E. Rose and H. C. Copeland. Various changes occurred in the personnel of the Company throughout the years which intervened, before its absorption by the Chico Gas and Electric Company, at which time its principal officers were Messrs. F. C. Luske, President, and A. G. Simpson, Secretary. As may be inferred, the making of gas from crude oil at that time in Chico was no more of a success than it had been elsewhere, and accordingly it was abandoned some 10 years ago and a coal gas plant installed, where we find Gilbert H. Taylor presiding as superintendent. This was in turn displaced by a Lowe water gas plant, in 1898, and that again by the present Lowe crude oil system, introduced on account of its advantages of economy and cheapness of oil, the set now used having a capacity of 3,000 feet per hour of 24-candle power, and is presided over by A. J. Stephens as Manager, in the interest of the California Central Gas and Electric Company.

Chapter XIV.

Woodland, another Oakland. The gas business in Woodland began in 1869, when the Pacific Pneumatic Gas Company was established, of which Ira P. Rankin was President and W. B. Isaacs was Secretary. There is no record at hand showing the amount of business done by the Company. In 1876 this plant was deeded to the Woodland Gas Company, of which J. O. Maxwell was President and J. Q. Brown, Jr., Secretary.

In 1886 the Woodland Electric Light and Power Company was established, and shortly aster J. Q. Brown, Sr., sold his interest in the gas plant. Later, in 1888, the Woodland Gas Company sold to the new company, known as the Consolidated Electric Light and Gas Company, of which John Martin was President, J. Reith, Manager, and A. W. Gable, of Woodland, were Directors.

In January, 1891, the Woodland Gas and Electric Company, the present owners of the plant, was formed, and in April of the same year the property of the Consolidated Company was transferred to this new Company, of which John Martin was President, J. Reith, Manager, and Thomas Thompson, Superintendent.

Reviewing the history of the plant, one is impressed by the fact that while in the early days of gas industry the amount of gas sold was greater during the winter months, to-day the greater amount is sold in the summer and early fall months, showing conclusively how fuel gas how grown to be the leading factor in the business.

Chapter XV.

Fresno; ash (a tree). The Fresno Gas and Electric Light Company was incorporated in 1883, with Louis Leach, President; F. G. Berry, Vice-President; W. W. Phillips, Secretary; Alex. Badlam and S. N. Smith, Directors; S. N. Smith was Superintendent. Price of gas was $5 per 1,000. Coal gas was used. Price of gas was reduced in 1884 to $4 per 1,000, and in 1890, the price per 1,000 was reduced another $1. At this time a Lowe water gas set was installed in duplicate. In 1896 the price of gas was reduced to $2 per 1,000 in order to compete with a water power transmission plant, which threatened to take all the lighting business, for there was no fuel trade to speak of. The Company did not pay very well for the next year or two, but through a lot of hard work in introducing gas stoves it finally came out with flying colors.

Mr. D. Decker was in charge from 1890 to 1897, when Mr. A. Gutsch took charge until 1898. Up to this time it took all the profits to get the fuel business introduced. At that time there were 750 consumers out of a population of 12,000. The directors and officers at this date were: Louis Einstein, President; F. G. Berry, Vice-President; L. P. Drexler, Leopold Gundelfinger, C. W. Barrett, Directors; Paul Huntzsch, Secretary; George S. Colquhoun, Superintendent. The business steadily increased as the city grew, until up to 1902 there were 1,100 meters in use, out of a population of about 15,000. Mr. John Martin purchased the controlling interest in the Company for the California Gas and Electric Corporation. Under the direction of Mr. E. C. Jones, about 10 miles of high pressure mains were laid, also an improved Lowe, crude oil water gas set was installed. The high pressure system, in addition to supplying consumers, is used to bolster up the low pressure system, giving a uniform pressure, even at the outlying ends of the low pressure mains. The price of gas was left at $2 per 1,000, but a discount of 25 per cent. is allowed when the bills are paid at the office on or before the 10th of each month, making it $1.50 per 1,000. There are now about 1,750 consumers, with about 1,800 ranges in use.

Chapter XVI.

Colusa, a rancheria name. The exact Indian pronunciation is exceedingly difficult to give, so the name passed through different modes of spelling until finally fixed by the legislation as Colusa. It has no known meaning. The Colusa Gas Company was incorporated March 5, 1886, and the Directors were George Hager, D. H. Arnold, W. P. Harrington, A. Bond, J. W. Goad, W. D. Dean and F. W. Jones. J. W. Goad was the first President of the Company, and M. G. Elmore the first Secretary. Price of gas was $4.50 per 1,000. In April, 1886, Mr. C. B. Ballantine was elected Secretary of the Colusa Gas Company to succeed Mr. Elmore. The first month 78,000 cubic feet of gas was sold; the first year 1,110,000 cubic feet. The subscribed capital was

$25,000. M. J. Boggs was elected Secretary, December 1, 1890, to fill the vacancy caused by the death of Mr. Ballantine.

October 23, 1901, the Colusa Gas Company changed its principal place of business to No. 31 New Montgomery street, San Francisco. At that time it became a part of the California Central Gas and Electric Company, which bought out the pole line erected by Dr. Coke, under the name of the Colusa Light and Power Company. P. M. Downing became the Manager of the new Company, now known as the Colusa Gas and Electric Company, and electricity was first brought into Colusa, October, 1901, from the Butte County Power Company's power house at Centerville.

The Lowe, crude oil system was put into operation at the gas works at the same time. The rate for fuel gas was $2.50 per 1,000, illuminating $3.50 per 1,000, with a discount of 50 cents per 1,000 if paid before the 10th of the succeeding month. Mr. John D. Kuster became Manager of the Colusa Gas and Electric Company, November, 1902. May 1, 1903, the price of gas was made, for fuel, $2 per 1,000, and $3 for illuminating, with a discount of 50 cents per 1,000 as formerly.

Discussion.

The President—I think Mr. Parker gave us about all of the history of the Pacific Coast gas companies worth relating. Does anyone present desire to offer anything respecting it?

Mr. Lowe—It is a very much easier matter for us, gentlemen, to sit and listen to this paper than it was for Mr. Parker to prepare it. It deals, of course, with dry facts not particularly interesting to us at present, unless we look at it all from the standpoint that we are all now resorting to our libraries for the purpose of ascertaining something of the early history of the gas business 50, 75 or 100 years ago. The time will come when the information given us to-day by Brother Parker will be just as valuable as that information we are now seeking in the past. The paper is a long one, but it is not sufficiently long because of the fact that it has dealt with only a few of the gas companies on the Pacific Coast. There is probably nothing of greater interest to such an Association as ours than a historical record of the past of the gas business. It has been considered a very excellent thing to have an Association historian, and that matter has been discussed from time to time, with the result that we should appoint a historian who can little by little each year add to the records of the past. I think the work should be taken up where Mr. Parker left off. The papers from year to year would be very short because containing only the happenings of the current year. I am sure we owe him a hearty vote of thanks for the work he has done. Personally, I am sorry it was not complete, dealing with the entire Coast, but, of course, if that were the case it would cover one of our entire volumes. I move a hearty vote of thanks to Mr. Parker for his timely paper. (Carried.)

THE NEXT MOVE WAS THE APPOINTING OF A HISTORIAN.

Mr. Lowe—I would like on this question to offer a resolution that the Association include a historical department, and that Mr. George P. Low, who has consented to act as the historian of the Association in the future, be appointed to fill that position.

The President—I do not believe anyone will doubt the importance of the position which we are about to introduce into this Association. I have very much pleasure in putting the motion that Mr. George P. Low be appointed historian. (Carried.)

COMMITTEES REAPPOINTED.

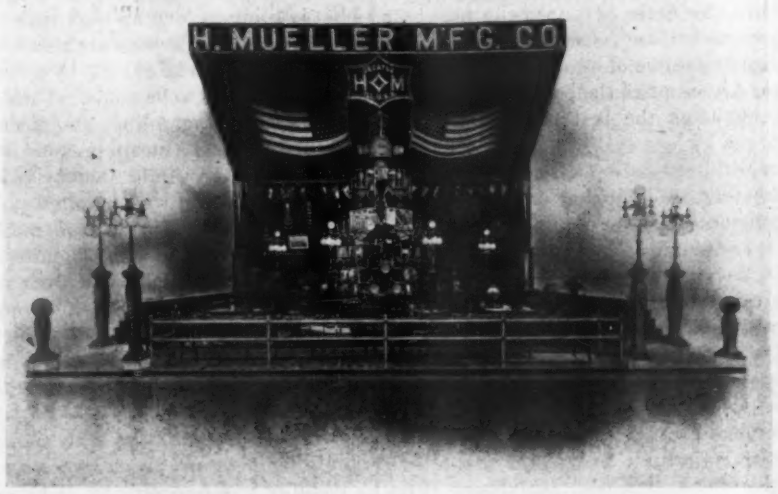
The President—Before we proceed to the next paper I will read the list of committees. The Advisory Board and the Committees on Library, Wrinkles, Experiences and Novelties will be continued during the coming year by the same gentlemen who have so admirably officiated during the past year.

(To be Continued.)

The Exhibit of the H. Mueller Manufacturing Company at the World's Fair, St. Louis.

On account of the wide publicity which has been given the exhibit of the H. Mueller Manufacturing Company, of Decatur, Ills., at the St. Louis Exposition, a keen interest has been awakened among the members of the trade concerning it.

The accompanying engraving gives a fairly good view of the booth as a whole, but it falls far short of portraying the beauty of the detail of the display. On account of the fact that the exhibit consists principaly of brass goods used in the gas, water and plumbing trades, one might be led to believe that it could not be made to look attractive; but such an idea is a much mistaken one. The display is unusually handsome. The furnishings are not gaudy, but they are expensive and elegant throughout. The woods are finished a dull Antwerp and the upholsterings are all in Spanish leather. The background of the booth is formed by a massive wall of black velvet and the large pyramid in the center is faced with French plate mirrors, secured on the edges with brass molding. On the sides are two specially designed daylight show cases, and in front is a railing of polished brass. The booth is lighted by a large electric sign, and by cluster electric lights mounted on handsome newel posts. The goods which the Company manufactures are tastefully arranged on the pyramid and in the show cases. In the foreground are chairs, desks and settees for the use of visitors. On the whole, the large canopied space affords roominess and opportunity for rest which would be impossible in an inclosed booth.



The goods displayed for the use of gas companies consist of gas main tapping machines, gas service, meter, union meter and stove cocks, meter connections, service clamps, meter couplings, pipe-end reamers, pipe taps, tools, etc. The tapping machines are clamped to a mounted pipe and the method of making a service tap and inserting a cock is shown by actual working demonstrations of the machines, both on dry pipes and on pipes under air pressure. The smaller articles, such as service cocks, stove cocks, etc., are also shown in sectional parts so that the working principles and the quality of the material can be seen. The meter connections are shown in cup, sweated and wiped joint, and with all the fittings used for connecting them to pipes and meters.

The Company also has in the same booth an exhibit of goods used in the water and plumbing trades. Although gas men are not directly concerned in these goods, yet they are interested to the extent of their being used in kindred trades, and an opportunity to inspect a high class exhibit of them is one which they should not fail to take advantage of.

The Mueller exhibit is located in the Palace of Manufactures, the first large building to the left of the Lindell, or Wabash, entrance to the Fair. E street is the first through street one encounters after passing in at this entrance, and the exhibit is just a short distance down E street, between 4th and 5th streets. If the visitor will look for the large electric sign and trademark shown in the illustration the exhibit will be easily found.

The exhibit is in charge of Mr. Oscar Mueller, Treasurer of the H. Mueller Mfg. Co., who will be pleased to show and explain the uses of the goods to visitors, and whose cleverness as a man of affairs may not truthfully be denied.

Compressed Air and Pneumatic Tools in Engineering Works.

By Mr. Frank Fielden, in *Engineering*.

What a vista of possibilities the engineer of to-day has, compared with his predecessors; in the rapid development of our engineering systems and organizations, the alliance of the chemist with the moulder, the specializing of processes and manufactures, the great advance in the building of machine tools, and the practical application of electricity; these and a host of other influences which, 50 years ago, were a thing to be dreamt of, are now actual realities and ready to hand as practical means to solve those problems and effect those economies which the exigencies of our present day call for.

Compared with his prototype of 50 years ago, the engineer of to-day must learn, and learn quickly, the bearings that a dozen different subjects may have on his work, and, most of all, he must be able to decide, out of the various methods and devices now open to him, which shall be the best and most economical. As each advancement has been secured in the great field of mechanical and electrical engineering, other objects have thereby been made possible of attainment, and it has now become, in a sense, not solely a question of the possibility of attaining a certain result or end, as it is to adopt the best practice in getting there.

Fifty years ago air compressors and pneumatic tools and plants were an expensive experiment. To-day they are knocking days, weeks and even months off the amount of time necessary for the construction and delivery of our locomotives, ships and gunboats, and the hundred-and-one different productions to which they have been successfully applied. What a host of manufacturers are dependent on the use of compressed air only a careful inquiry will convince; but as its versatility of application is becoming known, just so quickly is its development proceeding. In one sense it is similar to electricity, insomuch as the power can be taken to almost inaccessible places. It can be taken here, there, under, over, through, beyond, round a corner, in less time almost than it takes to write it; but it does not carry with it the danger that a high voltage current possesses, through possible damaged insulation. If the conducting medium, which is a tube, armored hose, for instance, gets damaged, it does not, like the electric current, damage by fire any inflammable material in its immediate vicinity. There is no danger from shock in handling the hose, as there is in touching a live wire.

Compared with the hydraulic means of conveying power, it is much cleaner and less objectionable; there are no jets of water squirting out and soaking everything in their path, and corroding all the metallic surfaces with which they might come in contact.

In the pattern shop it can be found pushing our old friend, the brace, into a well-earned rest, and converting what was previously a case of drudgery into a highly expeditious operation. As a breast drill you can apply whatever pressure you wish, and at the same time have both hands for guiding the auger.

If a job requiring a large number of mortise joints turns up, and you have not the mortising machine installed, by getting a light pneumatic hammer and a suitable chisel you can make 4 or 5 slotted recesses, while another man, plodding on in the old way, is making one.

The modern foundry is incomplete without an installation of compressed air. Instead of employing your skilled and highly paid moulders for riddling on sieving, a cheaper hand can be employed for feeding a pneumatic shaker, which, oscillating several hundreds of times per minute, will get through the work in one-tenth of the time. There are several types on the market, both fixed and portable. The portable machine can be carried to any position in the foundry, thus avoiding the use of the barrow in wheeling the sand away, and then back again, as with the fixed machine.

Pneumatic hand rammers and machine rammers can be got, and are well worth consideration from the up-to-date foreman or manager. For removing the sand from castings the sand blast is being very successfully applied in large numbers of foundries, especially on work too bulky or too fragile for the tumbler barrel.

A large amount of time can be saved in the fettling shop by supplying the dresser with pneumatic hammers, which, in the cutting off of fins and gits, etc., cannot be approached by the best hand chipper extant. Especially is the saving shown in dressing heavy castings. In the foundry of the works over which the writer has charge, where a large number of flywheels up to 20 tons are cast, the ease and facility with which the risers can be removed is at once striking and convincing as to the benefit of a pneumatic hammer over the old laborious method. The dresser takes up the hammer which is connected to a length of flexible armored hose, which in turn receives the air supply from the compressor through the medium of a permanent wrought iron pipe, and inserting a round-nosed or "C" chisel, dexterously grooves round the bottom of the riser, the chippings curl off as if by magic, as he skilfully guides the chisel round the root of the git, the silent air in the meantime supplying the physical force of the blows. Having made the groove round the 3-inch or 4-inch in diameter of metal, he takes up a sledge-hammer and with one blow removes the lump of waste metal, leaving a slightly raised surface above the level of the body of the casting; but replacing the "C" chisel by an ordinary flat chipping chisel, the surface is quickly leveled, and in 3 or 4 minutes all trace of the unsightly but necessary git is removed.

Not only has a plant been found beneficial in the more or less stereotyped applications to sand ramming, sieving and fettling, but in a score of other directions, under the supervision of a far seeing foreman, it has made itself a welcome addition to the foundry plant, and an ideal solution to so many of the perplexing problems which almost daily present themselves in a large sized jobbing foundry, where one never knows what is going to turn up next with respect to the kind of patterns to be moulded from. Perhaps an instance will suffice to show the usefulness and advantage to be gained by a compressed air supply. A number of flash boilers had to be made. These boilers, when made, consisted of a coil of steel tubing, 1-inch gas, entirely imbedded in cast iron. As the tube had to stand a steam pressure when in use of a 100 pounds to the square inch, and would thereby be subjected to a continual expansion and contraction, it was manifest that the tube should be injured as little as possible by the molten metal being poured round and about it, and to this end, having an outlet and inlet branch, one end was connected to the air supply, and during the process of casting a continuous current of cold air was blown through, and was found to be efficacious as a means of protection to the tube. The air was conveyed at about 80 pounds pressure through a hole in the connection $\frac{1}{4}$ inch in diameter; and as the diameter, and consequently the area, of the steel tube was very greatly in excess of this, advantage was taken of the now well known fact in connection with compressed air—viz., the great reduction in temperature which occurs when expansion takes place.

Possibly someone will say, Why not have used water? Water would certainly have conducted the heat away; but water is not a safe thing to use when molten metal is about. Leaky connections with air do no damage, but a water leak would be disastrous in a foundry.

In some classes of long, slender castings, such as piping, where the core is built round a thin tube, and, as is sometimes specified, chaplets have to be very sparingly used, the cooling effect of a current of compressed air will be found a very useful and convenient expedient to use to prevent the core being lifted in the middle by the molten metal.

In the machine and erecting shops one finds a multitude of jobs to which this son of Boreas can be successfully harnessed. Is there some cast iron milling to be done; then a stand pipe fixed near, and a piece of hose with jet pipe directed against the cutter, will clear the millings away as quickly as they are formed, and keep the cutters cool, so that increased spindle speeds are available. Certainly one would never advise a compressed air plant for the sake of keeping cutting tools cool; but where a plant is installed, it can be profitably employed on such jobs as these if, as is so often the case nowadays, quick dispatch is the important item.

The tinsmith in his brazing uses it for his blow pipe, and by so doing at once gets a constant current, whose strength is regulated at will, and gives him a better control of the job he has in hand, without the laborious pedalling of the foot bellows.

For even the very lightest riveting, down to $\frac{1}{4}$-inch diameter rivets, a hammer, weighing only a few pounds, similar to the ones used by ornamental masons can be got, and a lap joint or seam made in a tithe of the time taken up by the ordinary riveting hammer.

The commutator builder takes his blow pipe and walks round the commutator, the while he tightens the segments on the temporary

mandrel by means of clips, which, upon cooling, contract and hold the segments with a vicelike grip to enable the machinest to cut the taper tightening groove in the ends.

As a chipping hammer for steel plates or steel castings, any operator who is working piecework will convince the most sceptical as to the merits of a pneumatic hammer. Take a piece of plate, say ¼-inch thick, and attempt to cut off a ¼-inch thickness of material for, say, 12 inches in length, and compare the time with the two minutes, which is all that is required by the experienced operator using a good pneumatic hammer; or, again, head a ¾-inch rivet in the old way, and then count the seconds required to do the job pneumatically.

The rivet heating furnace is yet another innovation which has lately come within the scope of compressed air. The one referred to is one in which a high pressure current is forced through a very small area pin jet pipe, which is directed to the vortex of a funnel connected directly to the furnace, and acting in the capacity of a tuyere pipe. The consumption of high pressure air is very low, but its velocity induces a good supply of air through the funuel, and a large volume of draught is the result.

In the sizes of rivets scarcely anything is out of the range of the different styles and sizes of riveters now on the market, from the small converted stone chippers to the monster gap riveters which are becoming a common sight in our bridge and roof building works. In the boiler shop, where the old caulker could count his single blows, you must now count the strokes in hundreds if you visit a modern tool works.

For only in the province of work where originally the ratchet brace held the field, but in scores of instances where a fairly bulky piece has had to be removed from one part of the assembling shop by the overhead traveller to the radial drills, the pneumatic drill can be brought along, and the job drilled in position. Give an ordinary mechanic a job which will take, say, one hour, whichever way he does it—*i.e.*, uses the ratchet drill or dislodges his packings, or partly dismantles the adjacent connections, so as to take the piece to the radial drill (an easier job physically), and he would not be human if he did not risk an extra quarter or half hour in getting it to the machine rather than tackle the laborious drilling by the ratchet brace.

Substitute for either of these the pneumatic drill, and the verdict is (with apologies) "mechanics like it." One objection urged against these drills is that they are somewhat fragile and are costly in repairs; but, like any other good tool, they require careful and intelligent treatment. One never thinks of throwing a good watch about the bench or shop floor, and when it is considered that in a pneumatic drill weighing say 20 pounds, and proportionate dimensions, you are expected to have in a condensed and workable form a tool which will drill the same size of holes as an upright drill press with its 8-inch or 9-inch driving pulleys and coarse bevel wheels and large diameter spindle and long bearings—total weight, ½ ton or more—then the least to expect is that it shall receive careful treatment at the hands of the operator. Countersinking, rimering and tapping are only a few of the many applications of this tool. While on some jobs its use may not be very economical, on others, where a time limit has to be worked to, or where cheap labor cannot be employed, it steps in the breach and makes its presence felt.

Pneumatic hoists are now meriting consideration from those managers and superintendents who, like the writer, are mentally tortured by the sight of two men—in some cases skilled men—tugging at the chain of the slow motioned pulley block. How often is one exasperated, when attempting to increase the general pace in the works, to find this time wasting mechanism putting back the hands of the clock, so to speak, and setting the old slow speed. How many of our more or less up-to-date shops, where the main machine bays are spanned by good travellers, have in some out of the way corners auxiliary lifting tackle of the, let us hope, before long, prehistoric pulley block type?

But, since use begets use, and wider application produces greater demands, the conviction will be more greatly impressed that a modern works ceases to be modern where a compressed air installation is conspicuous by its absence.

The International Gas Exhibition at Earl's Court.[1]

For about 3 weeks now, the Directors and Committees of the gas undertakings of the United Kingdom have had before them communications soliciting their influence, interest, and support in making the forthcoming exhibition at Earl's Court the success that all having at heart the prosperity of the gas industry must desire. The results which have attended this appeal have, for the time which has elapsed since it was made, been of an encouraging nature to the Advisory Committee of the Institution of Gas Engineers; but it falls far short of what must be done, and what the Committee believe will be done, day by day, as Boards of Directors and Committees hold meetings at which the communications can be considered. We take this opportunity of asking those at the head of gas undertakings to let their replies be as early and as generous as possible; for the sooner the Advisory Committee know what they have at disposal the better, and the greater the amount of the support the more energetically and successfully will they be able to proceed to the work before them.

It may be there are Gas Directors and Committeemen who may argue with themselves that they have no power to dispose of funds for this purpose. To them, it may be said that "where there's a will, there's a way." There are others, too, who may be far removed from Earl's Court, who may excuse themselves with the thought that, through their geographical situation, they may not benefit from such an exhibition. It may be suggested to them that they are mistaken. For over 22 years now, there has not been a representative gas exhibition in this country—an exhibition which has been of sufficient importance to attract to it the eyes of the country through the Press and otherwise; and the time is now surely ripe, with the vast and far reaching improvements in gas production and utilization of the past quarter of a century, for an exhibition on the scale now projected. Though at Earl's Court the exhibition will be situated, it must be that its influence will extend to every corner of the country. All who have a part in the gas industry must share in the benefits and influence of the exhibition; all who will so share, should also share in its support.

Among our readers there are perhaps some who have not seen the circulars which were sent out by the Advisory Committee at the close of last month; and we therefore invite their attention to the following extracts. The first letter solicits the active sympathy and assistance of the members of the Institution of Gas Engineers. It is signed by the Chairman of the Advisory Committee (Mr. J. W. Helps), and reads:

The Advisory Committee appointed by the Council of the Institution of Gas Engineers desire to obtain the active sympathy and assistance of every member of the Institution for the performance of the arduous and responsible task laid upon them, of directing and co-operating with the organizers and managers of this exhibition, in order to make it worthy of the Institution and of the great industry to which we all belong.

The Committee are assured of your good wishes for the success of the exhibition, and the object of this communication is to acquaint you with what is being done, and to suggest how you personally may contribute towards the attainment of that high measure of success which the Committee hope to achieve.

You are already aware that the business part of the exhibition is being undertaken by two gentlemen of great experience in this particular class of commercial enterprise; the Council of the Institution being of the opinion that individual interest in the result, is the best guarantee of well directed service in so highly specialized a department of modern trade. The Advisory Committee believe that this part of the enterprise is safe in the capable and experienced hands of Mr. F. W. Bridges and Mr. G. D. Smith.

The Committee ask you to exert your influence with all firms and others personally known to you, whom you have reason to believe could advantageously take part in the forthcoming exhibition, with the object of securing their countenance and support. Should you have any objects of historical or special interest suitable for a loan collection of articles illustrating the gas industry—of which it is desired to make a feature of the exhibition—they will be gratefully received and well cared for by the Committee.

It is of the *first importance* that there should be no misunderstanding as to who is responsible for the inception of this exhibition—the first of its kind since the Crystal Palace Electric and Gas Exhibition of 1882. It is promoted by the Institution of Gas Engineers, to illustrate the advance of the gas industry since that date, and is intended to convince the public that the industry was never so flourishing, nor so well adapted to the service of humanity in multifarious ways, as it is now. Will you, therefore, be so good as to spread the truth of the nature and scope of the exhibition wherever you can, and do whatever is in your power to help it forward, and give it that fully representative, illustrative, and educative character, which is more to be desired than any mere financial profit on the venture?

The circular sent to Chairmen of Boards of Directors and Committees contained the following paragraphs:

The Advisory Committees appointed by the Institution of Gas Engineers to assist in the carrying out of this exhibition appeal to the proprietors of British gas undertakings for a fund, of moderate amount, to defray the necessary expenses of such features of the exhibition as will be of more benefit to the gas industry generally than remunerative to individual exhibitors.

1. *Journal of Gas Lighting.*

The Committee desires to make this exhibition an object lesson for the public as well as for architects, municipal engineers and surveyors, and those who are interested in smoke prevention and the improvement of the domestic arrangements of the people in the manifold advantages of gas.

The exhibition will show, collected together and authenticated, the best methods of using gas for street lighting, the lighting of public halls, shops and private dwellings, as well as all kinds of gas cookers and heating appliances, gas engines, etc. It is also intended to show models of artizan's dwellings, as supplied with gas by the prepayment system, and by means of furnished apartments of all descriptions, to show what service gas can render to the professional man, the merchant, the shopkeeper and the private resident. Cooking lectures and demonstrations will be arranged for and prizes offered for artistic gas fittings of all kinds.

As there has been no international or really representative gas exhibition since 1882, and having regard to the great developments which have taken place in connection with the industry since that date, it is anticipated that there will be shown on this occasion a great number of important manufacturing appliances, machines and processes using gas for various purposes. Opportunity will be afforded for making use of the exhibit for the instruction of engineering students. The exhibition will be registered under the Patent Acts for the encouragement of inventors, who will be invited to exhibit models and drawings of their inventions. Scientific and popular lectures will be given during the course of the exhibition.

The above are a few of the purposes for which the Committee are seeking funds, which will be expended only by their order.

The following scale of contributions has been deemed reasonable: For undertakings making under 50 million cubic feet per annum (say), £2 2s.; from 50 to 100 millions, £3 5s.; from 100 to 250 millions, £10 10s.; from 250 to 509 millions, £15 15s.; from 500 to 1,000 millions, £21. For companies making over 1,000 millions per annum, the subscriptions to be at discretion.

From this circular (which is also signed by Mr. Helps) it will be seen that the Committee are not asking or expecting anything unreasonable in the way of subscriptions. We have no doubt, however, that contributions in excess of the foregoing scale from companies and municipal gas departments of a liberal disposition will not be declined by the Committee.

The Law of Master and Servant.

Engineering (London) notes that a curious compensation case, which raised a somewhat peculiar point under the Workmen's Compensation Act, was recently heard by His Honor Judge Howland Roberts at the Dudley County Court. It appears that a signalman on the Great Western Railway met with an accident in the course of his employment which necessitated the amputation of one of his legs. He was wholly prevented from working for several months, during which time his employers paid him full compensation, in accordance with the Act of 1897. When his leg was completely healed, however, they applied to the County Court Judge, sitting as arbitrator, for a review of the payments, alleging that the incapacity for work which had been caused by the accident had ceased, and that they were no longer liable. It transpired that by this time the applicant was suffering from locomotor ataxia in an advanced stage, which wholly deprived him of the use of his limbs. At the hearing of the case medical evidence was called to show that the applicant was suffering from this disease at the time when he met with the accident, and that even if he had never met with any accident, the disease must at some time or other have rendered him incapable of working for his employers. On the other hand, medical witnesses called for the applicant, while admitting that the applicant may have had the germs of the disease of locomotor ataxia in his system when he sustained the injury, asserted that the progress of the complaint was materially hastened by the fracture of his leg. The learned County Court Judge in these circumstances came to the conclusion that there was evidence to justify him in finding that the total incapacity had been caused by the accident, with the result that the employers will have to pay compensation upon that basis. It seems to us that this is a rather startling declaration of an employer's liability. The natural inference is that if any man has any infirmity which may be hastened or aggravated by an accident in the course of his employment, the employer must be held responsible; and this although there may be evidence that the complaint from which the man is suffering must be dangerous or fatal. In this respect the case goes one step further than Lloyd *v.* Sugg (1900, 1 Q.B. 488), where the Master of the Rolls said: "It has been contended that the injury arising from the jar (in that case a jar was caused to the applicant's hand by a blow struck with a hammer upon the wrong part of an instrument held by him) would not be so great but for the gouty diathesis; but this point is absolutely immaterial * * * The same principle must be applied in these cases which has been followed in cases of injury caused by negligence, so far as regards causes contributing to the amount of the injury; for instance, in the case of a delicate lady receiving a shock in a railway accident, the actual shock would be the same as in the case of a lady in sound health, but the resulting injury would be far greater; in every case the ultimate result differs according to the physical condition of the person at the time of the accident." Cases are also upon record where "disease" itself has been held to be an accident.

In Higgins *v.* Campbell (20 T. L. R., 129) a workman, who was employed in a wood combing factory, had, in the course of his employment, to sort or open bales of Persian wool, and in doing so he caught anthrax, a disease which is commonly imported into this country in Persian skins. It was decided that this was an injury caused by "accident" arising out of, and in the course of, the employment within the meaning of Section 1 of the Act.

The moral of the case decided by Judge Howland Roberts is that the employers, or the insurance company who are responsible for accidents, should take steps to ascertain whether any of their workmen are suffering from any disease which may be aggravated by a slight accident. By doing so it may be possible to avoid the grave consequences which may ensue.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE proprietors of the Enfield Light and Power Company, of Thompsonville, Conn., are seriously considering the matter of constructing a gas plant. Such a step would undoubtedly prove a profitable one, for a good business on fuel account could readily be developed. The head of the Company is Mr. L. A. Upson.

MR. L. L. KELLOGG, General Manager of the Sioux City (Ia.) Gas and Electric Company, says that there is nothing in the rumor that the Swift and Armour interests propose to construct and operate an electric lighting plant in the place named.

MR. W. J. THAYER, of Spokane, Wash., says that construction work on the gas plant for Lewiston, Idaho, will be commenced at once.

MR CHARLES F. HOPPE, General Manager of the Owensboro (Ky.) Gas Light Company, has arranged for the rehabilitation of the works. The main system will also be largely extended.

THE St. Paul (Minn.) Gas Light Company has agreed to supply electric currents in the outlying district known as Merriam Park.

MR. J. R. MCCLINTOCK has resigned the place of Superintendent to the Alexandria (Ind.) Gas Company. He has accepted a position in the inspection division of the Indianapolis water works.

THE proprietors of the Chicago Heights (Ills.) Gas Company have issued a mortgage in the sum of $200,000. The bonds are to run for 30 years, and are to bear interest at the rate of 5 per cent. The Company first sent out gas in May, and the trading so far done is quite 20 per cent. in excess of the estimates made by its projectors.

THE Public Service Corporation, of New Jersey, will furnish the residents of Dunnellen with gas. The supply will be made from the Plainfield works.

THE proprietors of the Clinton (Mass.) Gas Company have certified to an increase of $25,000 in its capital stock.

MR. EARLE H. BUCK, formerly Superintendent of the Citizens Gas Light Company, of Vincennes, Ind., and who resigned that position when the Company was taken over by the Vincennes Light and Power Company, has started in the plumbing and heating business in Vincennes.

"A. F. T.," writing from Alton, Ills., under date of the 25th of August, has this to say about matters pertaining to the lighting and traction interests of that city: "Secretary of State Rose to-day issued a

license to incorporate the Alton Gas and Electric Light Company. The capital stock is put at $500,000, and the avowed object of the concern is to 'furnish heat, light and power.' The incorporators are Charles A. Caldwell, George M. Ryle and L. Davis. One of the officers of the concern, when interviewed on the subject, stated that the corporation merely meant a separation of the business of the local street car company from the gas and electric supply. Since the consolidation of the car system with the St. Louis Car and Granite Company it was deemed advisable to operate on distinct lines."

THE Binghamton (N. Y.) *Republican*, of the 29th August, insists that Corporation Collector Hale's levy for unpaid taxes, on the property of the Norwich (N. Y.) Gas and Electric Company, amounting to $500, will result in a public sale of the property at 10 A.M. of next Wednesday.

THE Pennsylvania Railroad Company has discontinued its electric plant in Lambertville, N. J., and the lighting of its station, freight houses and offices will be done by the local gas men.

MR. A. M. BARNES, and a very active Manager he is, says that within a fortnight the Company's main office will be the chief point of attraction in the business center of Cambridge, Mass.

THOSE interested in the final outcome of the winding-up of the affairs of the Bay State Gas Company, will likely have food for thought in the following, which came to us from Boston, under date of August 27th: "The income bondholders of the Bay State Gas Company are preparing to contest the settlement which has been effected between Receiver Pepper and Messrs. Kidder, Peabody & Company. The income bondholders say that they have fought for 6 years for their property, and that a situation which was worth $1,000,000 at least is now being sacrificed under this settlement without any equivalent. They say that they have gone so far in their litigation as to secure a court decision from Judge Ray, that the Mercantile Trust Company had no right to dispose of the 15,000 shares of Bay State Gas of Massachusetts stock, as they were never legally possessed of this stock, according to the declaration of this United States Judge. This decision would have to be passed up on appeal; but if the settlement of Receiver Pepper with Messrs. Kidder, Peabody & Co. stands, the income bondholders are deprived of any right to further progress in the matter. Those 15,000 shares of Bay State Gas of Massachusetts represent ¼ of the capital stock of the Company, which is the only Company that has the right to go into every street and alley in the city of Boston. All the other companies in Boston are purely local with restricted territories. It will be recalled that, under the Lyford act of the Legislature, the famous $4,500,000 note of the Bay State Gas Company, of Massachusetts, which was held by the Bay State Gas Company, of Delaware, as security for the income bondholders, was cancelled and delivered over to the Secretary of State of Massachusetts, and $1,500,000 capital stock in place thereof was permitted under this Lyford act to be issued therefor. This new stock was delivered to the Mercantile Trust Company as security for the first and second mortgage bonds because the indenture of these bonds provided that the Mercantile Trust Company should always have the share control of the several Boston Gas Companies. It is claimed that the right to sell this stock never existed; that in effect the Mercantile Trust Company had it only for voting purposes, and not as security for the first and second mortgage bonds; that, as security, it in law and equity belongs to the income bondholders. But the rights of the income bondholders to pursue this matter are absolutely cut off by the settlement with the receiver and Messrs. Kidder, Peabody & Co., because the receiver in law represents the income bondholders. The income bondholders are now preparing to petition Judge Dallas to reopen the case. There was originally issued $2,000.000 of Bay State Gas income bonds. The Company has bought in, largely from the proceeds of stock sales, $1,600,000, and about ¼ of the remaining outstanding bonds are in alliance in the so-called Edwards litigation, and will continue to prosecute the litigation if the settlement of the receiver with Messrs. Kidder, Peabody & Co. can be upset so far as the Mercantile Trust Company, of New York, is concerned."

LAST week we briefly noted the resignation of Mr. Fred B. Wheeler, as Manager of the Binghampton (N. Y.) Gas Works Company, which mention included a line or two respecting the action taken by the Company regarding its estimate of his services thereto. Since then we have received the set words of the Company's appreciation, which were as follows:

"*Resolved*, That the members of this Board, in accepting the resignation of Fred. B. Wheeler. as General Manager and Assistant Secretary of the Company, wish to place on record their appreciation of his long and faithful work in building up the business of the Company and in faithfully directing the expenditure of a large amount of capital for purposes necessitated by the rapid growth of the Company under his management. We regret that he has found it necessary to resign his position and extend to him our sincere wishes for his future continued success in every possible way; and,

"*Resolved*, That as a token of our regard we direct the Treasurer of the Company to hand him the amount of 2 months' salary as an honorarium; and,

"*Resolved*, That a copy of these resolutions be handsomely engrossed, signed by all the officers and Directors of the Company, and presented to Mr. Wheeler."

C. W. TAYLOR, writing from San Francisco under date of August 26th, says: "Judge Trout, of the Superior Court, yesterday modified his injunction order of July 27, restraining the San Francisco Gas and Electric Company, the Judges and the Chief of Police from causing the arrest and prosecution of D. J. Sullivan and other house movers for cutting the Company's wires in the course of their business. The modified order requires that the house movers shall give the Company notice in writing of intention to move through the wires and the Company shall cut the wires. The house movers must pay the actual cost of labor and materials employed in each cutting and shall give a form of bond which has been agreed upon. The bond secures the payment for each case of wire cutting, but provides that if the litigation now pending is decided in favor of the house movers the Company will have to pay the money back. If there is future trouble over the payments it is agreed that each payment may be a separate cause for action or all may be joined."

THE La Grange (Ills.) Gas Company is making good progress on the pipe connection between the settlements of Downer's Grove and Wheaton. In fact, both places will be hooked up by October 1st, which rather goes to prove that the promises of the builders to have gas turned on in the named places by December 20th will be easily kept.

MR. AUGUSTUS BRANDEGEE has been elected President of the New London (Conn.) Gas and Electric Company, vice the late Robert Coit. Mr. James Hislop was elected Vice-President.

MR. THOMAS D. MILLER, Manager of the New Orleans Lighting Company, has been elected a juror on the Committee on Awards respecting the lighting of the grounds and buildings, St. Louis World's Fair.

"THE Purifyer" is the name of a letter sheet that is to be published once a month in San Francisco, the function of which is to promote the interests of the Pacific Coast Gas Association. So, after all, the Association has an official organ. The leading article in the August number is on the "Estimation of 'Sulfur' in Petroleum." Great is the Coast, but forgetful are some of its gas men.

Pipe Lines in India.

Speaking of the progress the Burmah Oil Company is making in India, the London *Commercial Intelligence* says: "The first instalment of 40 miles of piping for 400 miles of pipe line which the Burmah Oil Company is constructing from its wells in Upper Burmah to its refineries at Rangoon is now in course of shipment and the whole length is expected to be completed within 12 months' time. This will enable the Company to largely increase its supplies, which at present are limited by the difficulties of river carriage, and instead of importing kerosene oil to the value of 4 or 5 crores per annum, it is not improbable that, as the result of the extensive developments which the Burmah Oil Company is now making, India will not only be able to supply the whole of its own requirements, but before very long be an exporter of oil to other countries.

"To cope with the larger supplies of oil which will shortly be available, the company is making extensive additions to its refineries at Rangoon and adding several large tank steamers to its fleet, and it is also, in addition to the existing installations in Rangoon and Calcutta, erecting tank installations at Chittagong, Madras, Bombay, Karachi, Marmagao and other coast ports. This concern, the capital invested in which amounts to several millions of pounds, is now by far the largest industrial undertaking in India, and when the extensions now in progress are completed it will rank as one of the biggest oil producers in the world."

THE AMERICAN GAS LIGHT JOURNAL

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NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, SEPTEMBER 5, 1904.

The Market for Gas Securities.

Trading in Consolidated was slight since last time of writing, but prices were on the whole steady. The closing to-day (Friday) was reported at 195 to 196. There was some inquiry for Mutual, but the disparity between the value estimate of buyers and sellers was too great to admit of actual trading. The shares are 290 bid, offered at 310.

Brooklyn Union is 219 bid, the nominal offering price being 220. An order for 500 shares at the market would send it to 230. Baltimore Consolidated, of Baltimore, is 81¼ bid, and those who are buying at the advance are certainly in the class who know a good thing. Laclede preferred has advanced in bid price to 85, and Cincinnati keeps on its upward way. Peoples, of Chicago, also holds its recent advance. Washington, D. C., is 288½ bid. The Bay State income bondholders are making a "lusty squeal" over the Pepper settlement, but we fear their signs of pain will go unregarded.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

SEPTEMBER 5.

☞All communications will receive particular attention.

☞The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	195	196
Central Union, Bonds, 5's.	3,000,000	1,000	106½	108½
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	118	120
Metropolitan	658,000	..	108	112
Mutual	3,500,000	100	270	300
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co.. Bonds, 5's	11,000,000	1,000	107½	109
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	35	..
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	..	..	..
Northern Union, Bonds, 5's.	1,250,000	1,000	103½	105½
New York and East River..				
Bonds 1st 5's	3,500,000	1,000	111	113
" 1st Con. 5's	1,500,000	..	106	108
Standard	5,000,000	100	125	13
Preferred	5,000,000	100	145	155
Bonds, 1st Mortgage, 5's	1,500,000	1,000	116	117
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	2.9	220
" " Bonds (5's)	15 000,000	1,000	113	115
Bay State	50,000,000	50	—	—
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	28	30
" 1st Mtg. 5's	509,000	1,000	93	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	3¾	4
" " Bonds, 5's	5,250,000	1,000	12¾	.
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104⅛
Cincinnati Gas and Electric Co	29,500,000	100	106½	106¾
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	97½	99
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	88¾	89½
Preferred	3,026,500	100	107½	109
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	81¼	..
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	86	90
Consolidated G. & E. Co.'s. Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co	4,825,500	50	..	50
" Prior Lien 5's	5,603,000	1,000	99½	100
Detroit Gas Co., 5's	781,000	1,000	75	75¼
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	85	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	..	78	80
" Bonds, 5's	10,500,000	..	105¼	106
Indianapolis	2,000,000	..	60	70
" Bonds, 6's	2,650,000	..	103⅛	106½
Jackson Gas Co	250,000	50	73	75
" 1st Mtg. 5's	290,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	..	..
Preferred	2,500,000	100	85	100
Bonds	10,000,000	1,000	109⅛	110
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	136	140
Madison Gas & Elec. Co. " 1st Mtg. 6's	350,000	1,000	107½	108¼
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	218¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co.	6,000,000	..	56	58
Bonds, 6's	4,600,000	..	105	105¾
New Haven	1,000,000	25	64	70
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	102	102½
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	.
Rochester Gas & Elec. Co..	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87¾	90
San Francisco, Cal.	15,800,000	100	58½	58¾
St. Joseph Gas Co. " 1st Mtg. 5's	751,000	1,000	92	96½
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	118	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	92	93
Syracuse, N. Y.	1,975,000	100	46	48
Bonds	2,047 000	1,000	94	96
Washington, D. C	2,500,000	20	288½	289⅝
First mortgage 6's	600,000	..	..	..
Western, Milwaukee	4,000,000	..	..	..
Wilmington, Del	600,000	50	200	..

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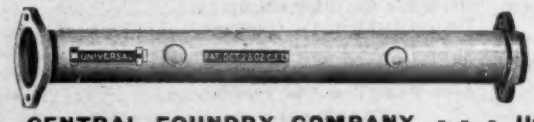

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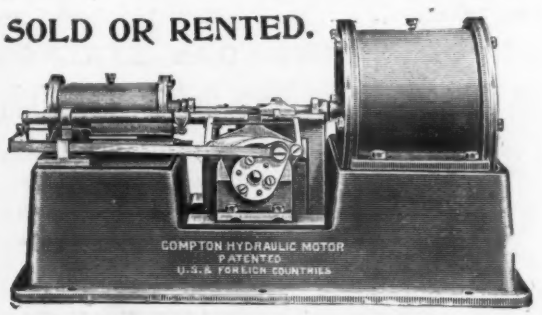

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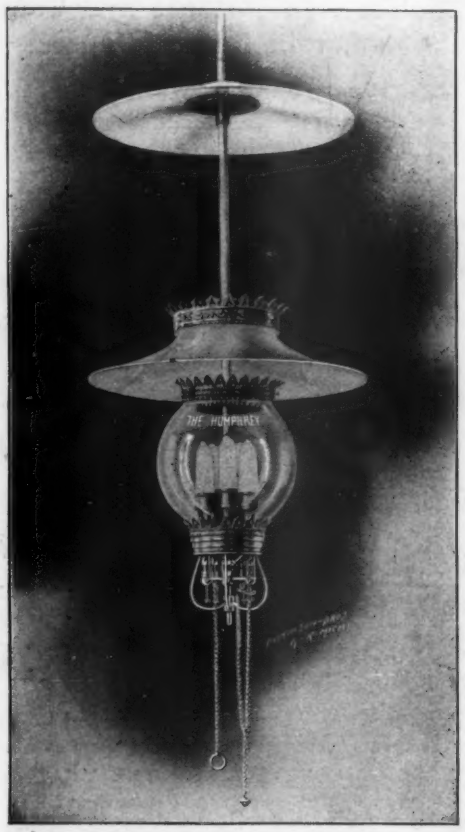

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have been caused by slot meters, through gas being inadvertently turned on in sleeping rooms. The Reeves' Attachment entirely prevents the possibility of such an occurrence, because the gas does not go out for 10 or more hours. Drops to a small flame, and amount so used is automatically deducted from next prepay. Other important improvements.
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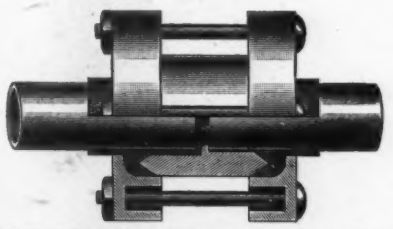
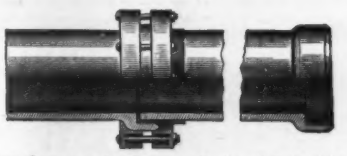
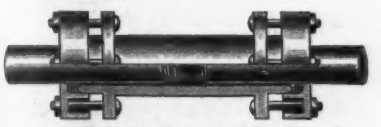


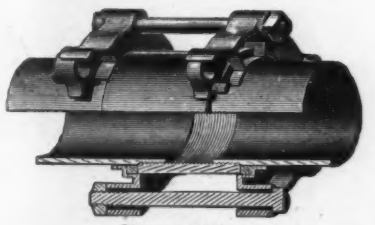
Insulating Coupling for Wrought Iron Pipe. Style 5.



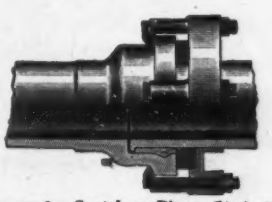
Insulating Coupling for Dresser Bell and Spigot Cast Iron Pipe. Style 6.



Regular Sleeve. Style 2.



Clamp. Style 4.



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My Insulating Coupling prevents the destruction of pipe by electrolytic action, in either water or gas lines.

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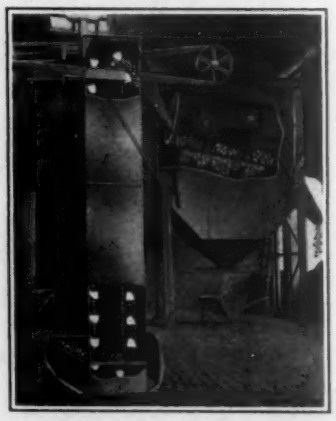

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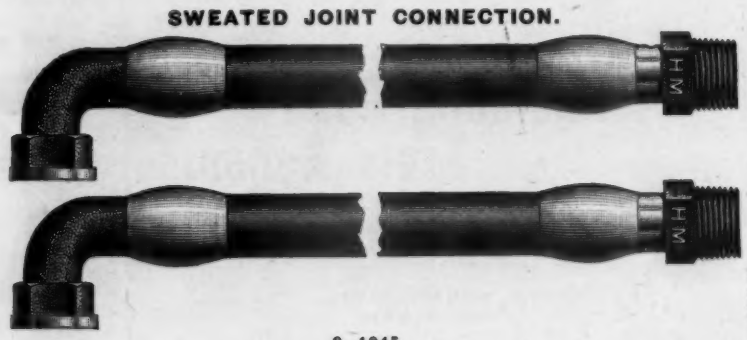
SWEATED JOINT CONNECTION.



C—1045.

Unless the lead ends are accurately shaped the solder on a wiped joint connection won't adhere to the parts and make a solid joint.

Mueller Sweated Joint Meter Connections have the lead formed by specially constructed lathes, and their accuracy is mechanical. The solder adheres to every part and makes an inflexible joint.

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BY UTILIZING A

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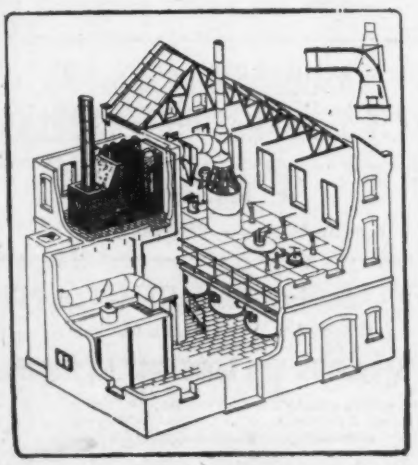

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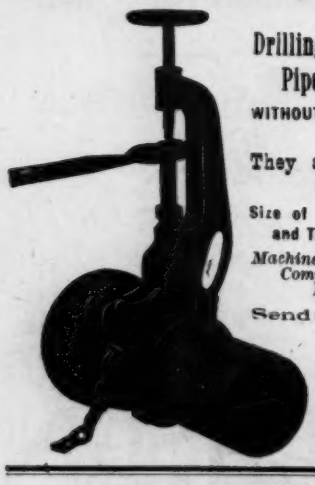

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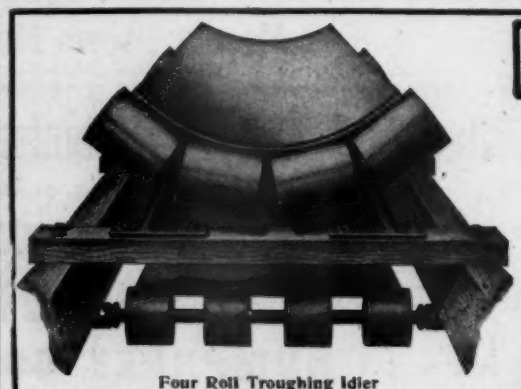

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FOR WIDE BELTS.
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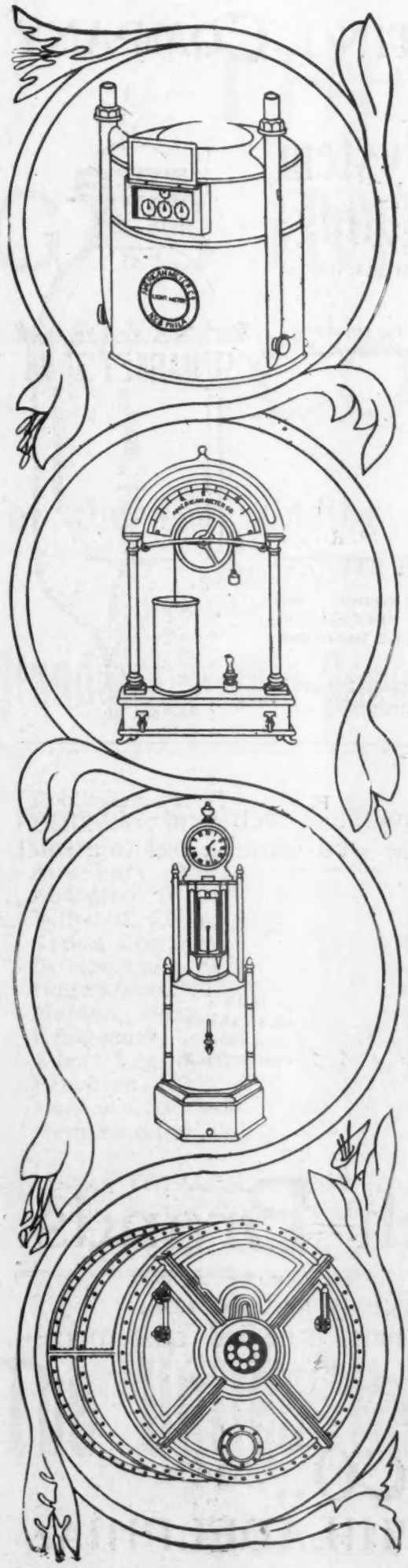

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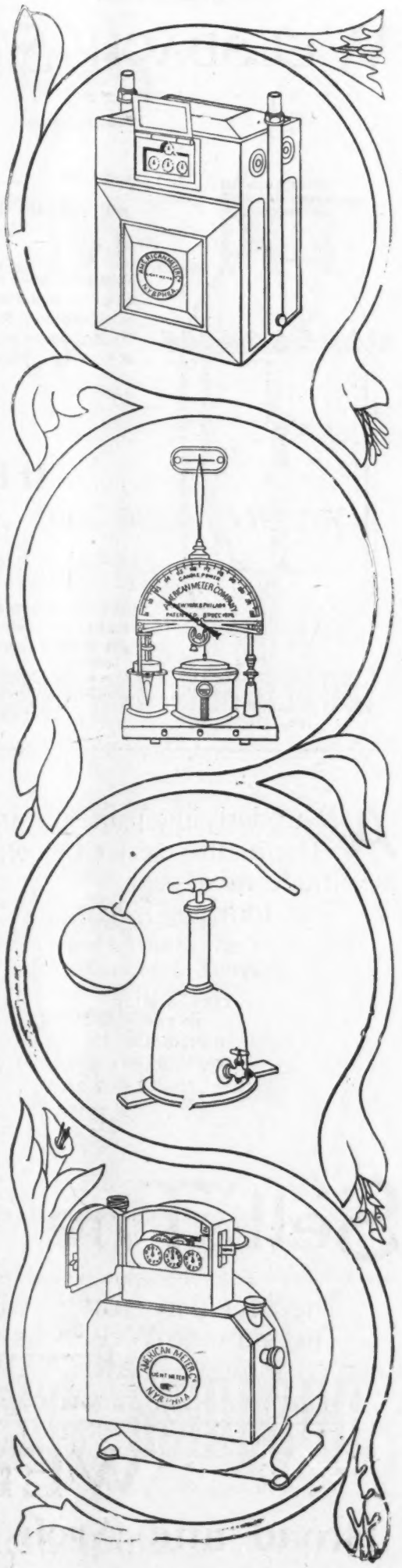
PUBLIC LIGHTING TABLE.

SEPTEMBER, 1904.

Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Light.	Extinguish.
				P.M.	A.M.
Thu.	1	7.00 PM	11.10 PM	6.30	4.20
Fri.	2	7.00 LQ	11.50	6.30	4.20
Sat.	3	7.00	12.40 AM	6.15	4.30
Sun.	4	6.50	1.30	6.15	4.30
Mon.	5	6.50	2.40	6.15	4.30
Tue.	6	6.50	4.30	6.15	4.30
Wed.	7	6.50	4.30	6.15	4.30
Thu.	8	6.50	4.30	6.15	4.30
Fri.	9	6.50 NM	4.30	6.15	4.30
Sat.	10	6.50	4.30	6.05	4.40
Sun.	11	6.40	4.40	6.05	4.40
Mon.	12	6.40	4.40	6.05	4.40
Tue.	13	6.40	4.40	6.05	4.40
Wed.	14	8.40	4.40	6.05	4.40
Thu.	15	9.20	4.40	6.05	4.40
Fri.	16	10.10 FQ	4.40	6.05	4.40
Sat.	17	11.00	4.40	5.55	4.50
Sun.	18	12.00	4.50	5.55	4.50
Mon.	19	12.50 AM	4.50	5.55	4.50
Tue.	20	1.50	4.50	5.55	4.50
Wed.	21	2.40	4.50	5.55	4.50
Thu.	22	3.40	4.50	5.55	4.50
Fri.	23	No L.	No L.	5.55	4.50
Sat.	24	No L. FM	No L.	5.40	5.00
Sun.	25	No L.	No L.	5.40	5.00
Mon.	26	6.20 PM	8.00 PM	5.40	5.00
Tue.	27	6.20	8.30	5.40	5.00
Wed.	28	6.20	9.10	5.40	5.00
Thu.	29	6.20	9.50	5.40	5.00
Fri.	30	6.20	10.40	5.40	5.00

TOTAL HOURS LIGHTING DURING 1904.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	225.00	January	423.20
February	205.40	February	367.40
March	187.40	March	355.35
April	169.50	April	298.50
May	152.30	May	264.50
June	137.20	June	234.25
July	138.50	July	243.45
August	151.00	August	280.25
September	164.40	September	321.15
October	191.30	October	374.30
November	210.30	November	401.40
December	237.10	December	433.45
Total, yr.	2171.40	Total, yr.	4000.00



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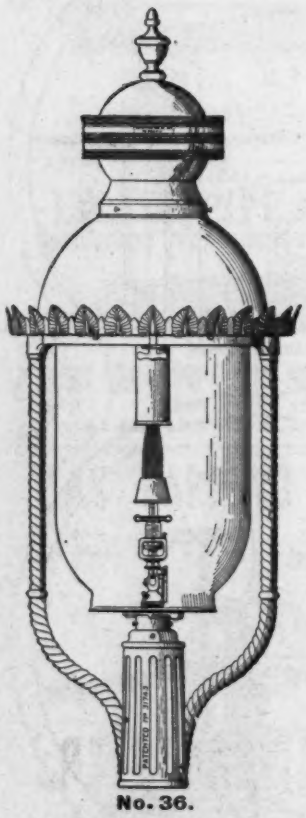
WELSBACH STREET LIGHTING COMPANY

.... OF AMERICA ....



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POINTS OF MERIT:

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The formula is simple-

THIS SHIELD IS THE WELSBACH TRADE MARK.

IT IS A GUARANTEE AND A PROTECTION.

Sell The Welsbach Brands.

The imitation stuff is bad for the customer---which is bad for you.

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And your profit isn't merely dollars and cents.

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For the Year Ending December 31, 1903. has been Awarded Contracts in the Following Places for

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Baltimore, Md.	Lynn, Mass.	New York (Central Union Co.)
Chicago, Ills.	Newark, N. J.	Cicero, Ills.
Amesbury, Mass.	Washington, D. C.	Chicago (Ogden Co.)
Aberdeen, S. D.	Boone, Ia.	Easton, Pa.
Winsted, Conn.	Pueblo, Col.	Lawrence, Mass.
Canon City, Col.	Charlotte, N. C.	Council Bluffs, Ia.
Schenectady, N. Y.	Fall River, Mass.	Chattanooga, Tenn.
Hagerstown, Md.	Duluth, Minn.	Tuckerton, N. J.
Malden, Mass.	New York (Mutual Co.)	Springfield, O.
Bridgeport, Conn.	Waltham, Mass.	Easton, Pa. (2d contract)
Albert Lea, Minn.	Dover, Del.	Mobile, Ala.
Brooklyn, N. Y.	York, Pa.	Conshohocken, Pa.
Kansas City, Kas.	Minneapolis, Minn.	Mason City, Ia.
Hempstead, N. Y.	Allentown, Pa.	

TOTAL SETS FOR 1903, ... 62
TOTAL DAILY CAPACITY, ... 62,950,000 cubic feet.
TOTAL SETS TO DATE, ... 508
TOTAL DAILY CAPACITY, ... 362,780,000 cubic feet.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

Established 1858. Incorporated 1890.
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OFFICE, 418 to 422 East 23d St., N. Y.

Clay Gas Retorts,

BENCH SETTINGS,

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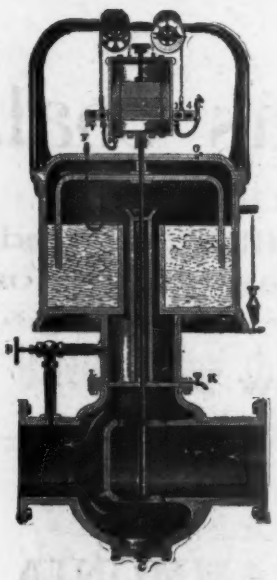

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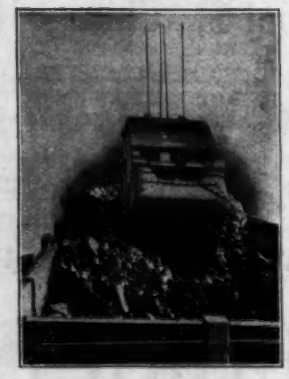

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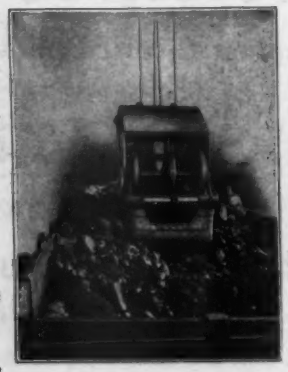

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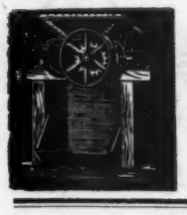

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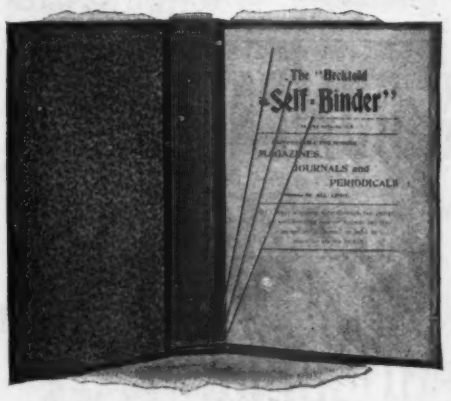

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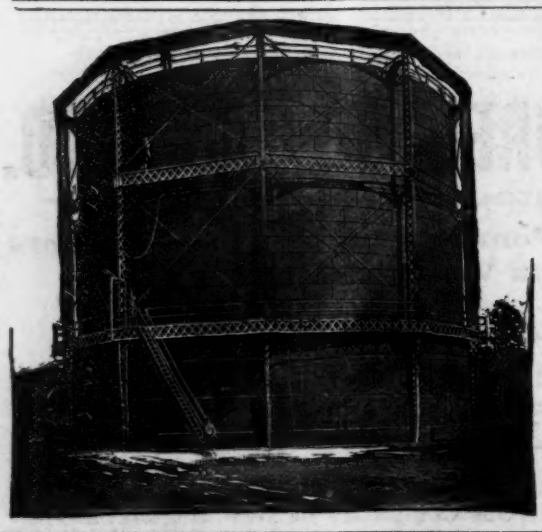

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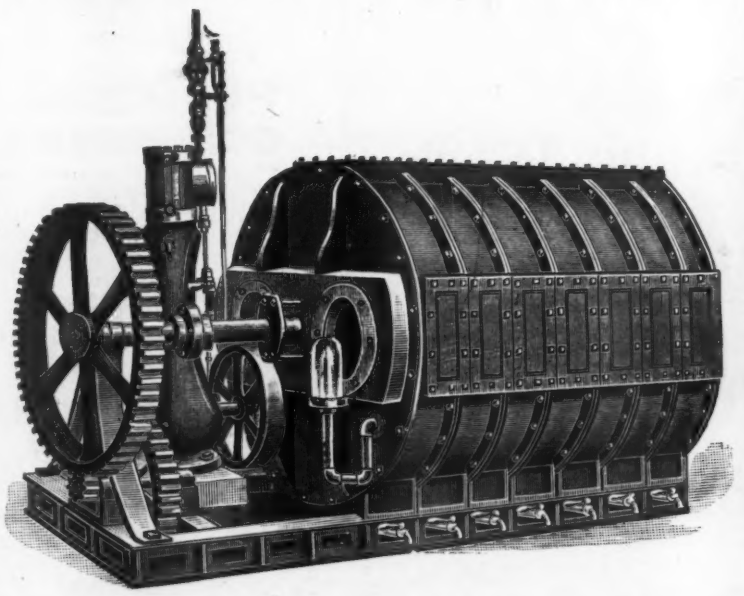

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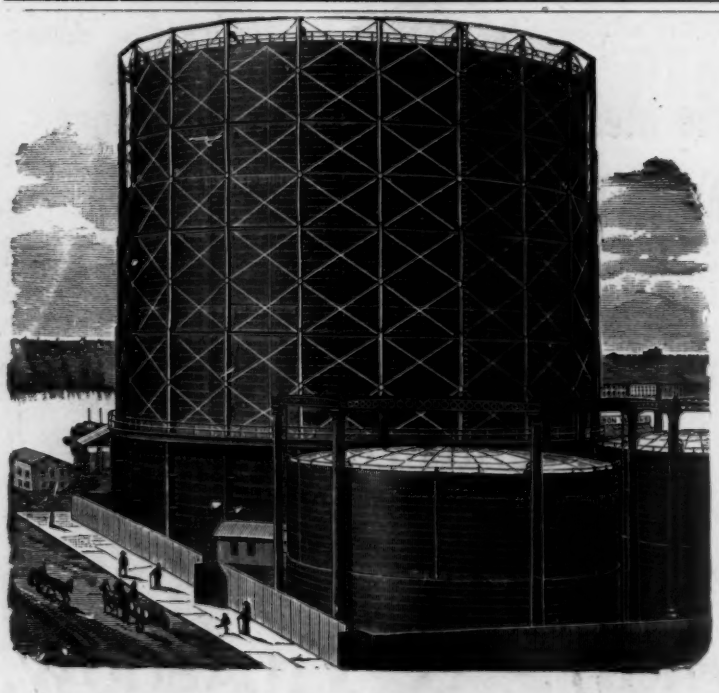

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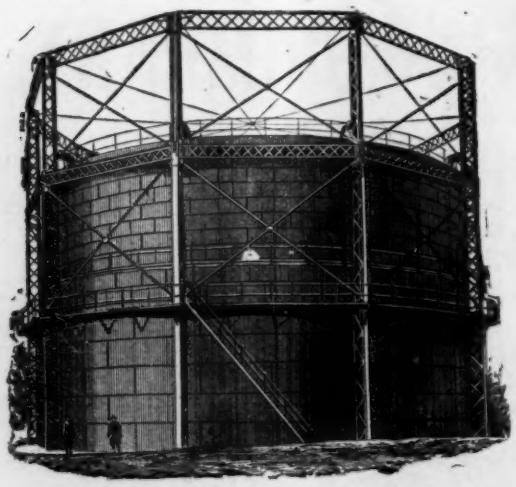

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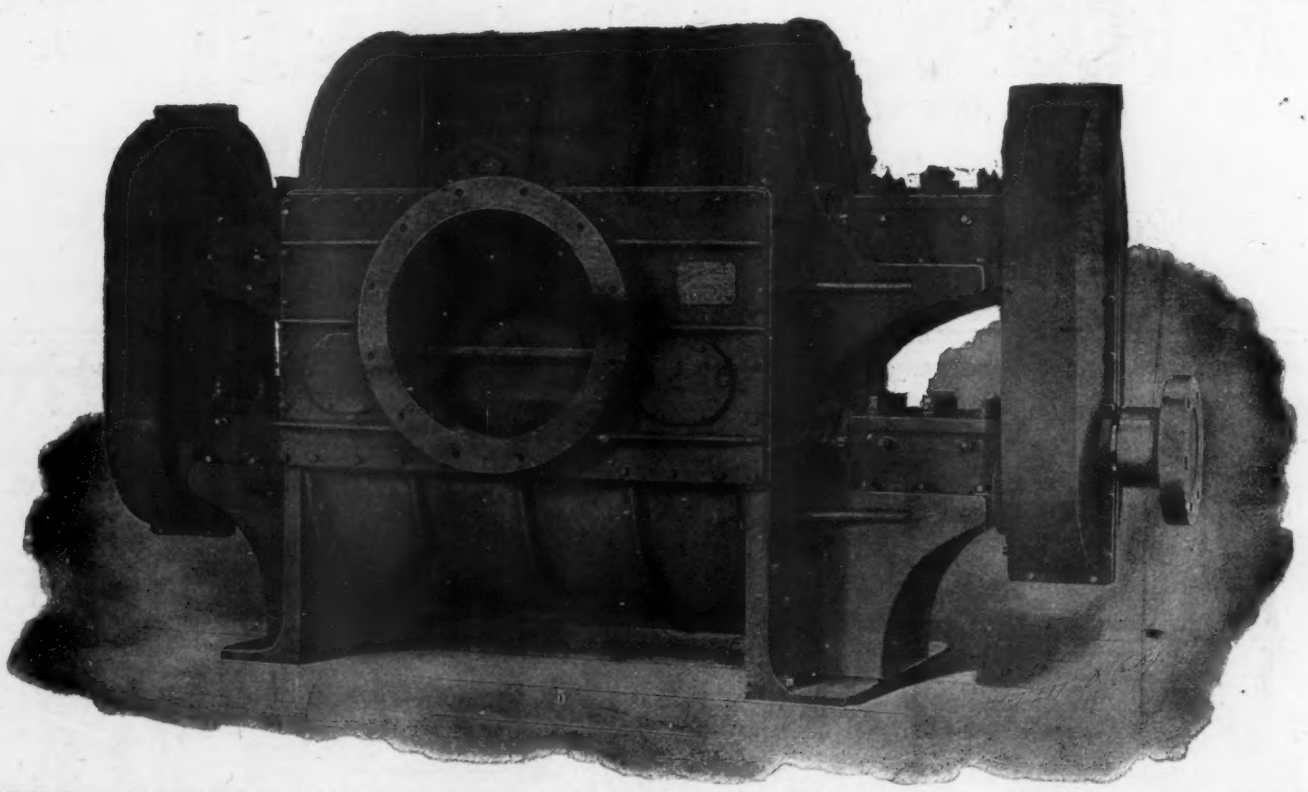

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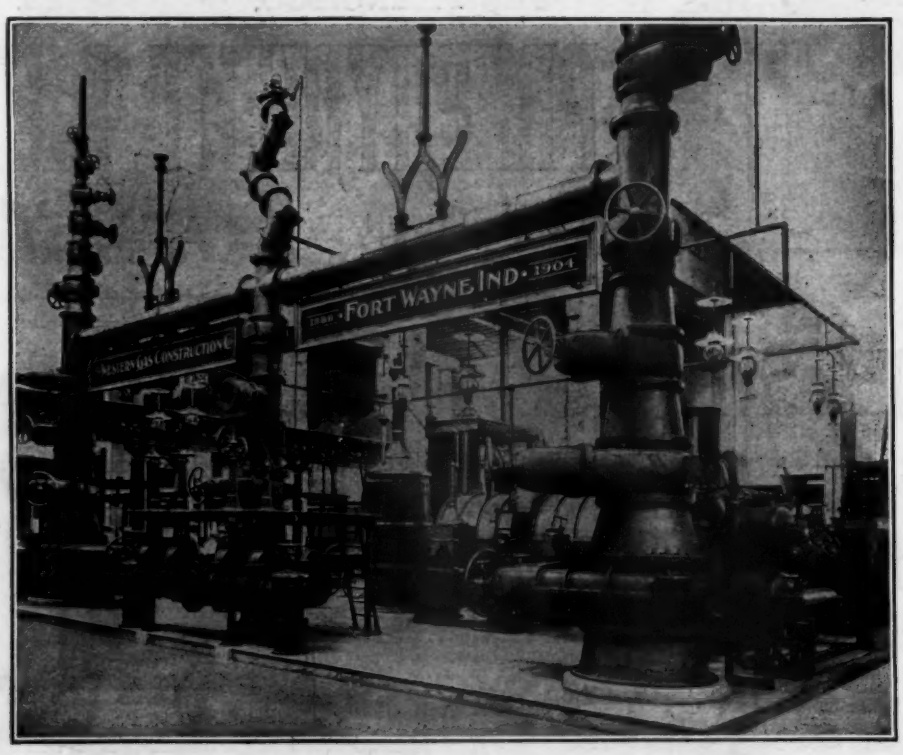

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